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Table of Contents.

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ORIGINAL ARTICLES— Page.
Juvenile Posture of the Legs and Knees, by E. E. Price, M.D., F.R.C.S., F.R.A.C.S. .. 589
Posture Fundamentals, by Jean Macnamara .. 592
A Review of Fifty Cases of Gastrectomy for Peptic Ulcer, with Special Reference to Local Anæsthesia, by V. J. Kinsella .. 595
The Treatment of Acute Lumbago and Acute Low-Back Strain in General Practice, by James H. Young, M.D., M.R.A.C.P. .. 596
Acute Porphyria, with Report of Two Cases, by Basil S. Hetzel .. 600
Enterocele, by Hubert K. Porter .. 602
Injury to the Semilunar Cartilage in the Knee Joint: A Review of 140 Cases, by C. H. Hembrow, A. J. W. Ahern, Grayton Brown, S. F. Reid and G. C. V. Thompson .. 605
Influenzal Meningitis, by G. A. Robbie and W. R. Pitney .. 609

REVIEWS—
Bone Marrow Biopsy .. 610
A Year Book of Pathology and Clinical Pathology 611
Clinical Case-Taking .. 611
A Year Book of Endocrinology, Metabolism and Nutrition .. 611
Coronary Artery Disease .. 611
Histochemistry and Cytochemistry .. 612

BOOKS RECEIVED .. 612

LEADING ARTICLES—
The Nuffield Foundation in Retrospect and Prospect 613

CURRENT COMMENT—
Replacement Transfusion .. 614
The Effect of Alcohol and Exertion on the Sequels of Hepatitis .. 614
Mercurial Poisoning from Fingerprints .. 615

ABSTRACTS FROM MEDICAL LITERATURE— Page.
Pædiatrics .. 616
Orthopædic Surgery .. 616

SPECIAL ABSTRACT—
Hair and Scalp Treatments and Preparations .. 618

BRITISH MEDICAL ASSOCIATION NEWS—
Scientific .. 619
Sir Charles Hastings Clinical Prize .. 620

MEDICAL SOCIETIES—
Melbourne Pædiatric Society .. 620

CORRESPONDENCE—
Some Problems Associated with the Management of Carcinoma of the Breast .. 621
A Case of Rare Fallopian Tubal Abnormality .. 622
Syphilis Resurgens .. 622
Studies on the Epidemiology of the 1947-1948 Epidemic of Poliomyelitis in South Australia 622

NAVAL, MILITARY AND AIR FORCE—
Appointments .. 623

POST-GRADUATE WORK—
The Post-Graduate Committee in Medicine in the University of Sydney .. 623

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA .. 623

OBITUARY—
Hibbert Alan Stephen Newton .. 624
Hilda Wienholt .. 624

NOMINATIONS AND ELECTIONS .. 624

DIARY FOR THE MONTH .. 624

MEDICAL APPOINTMENTS: IMPORTANT NOTICE .. 624

EDITORIAL NOTICES .. 624

JUVENILE POSTURE OF THE LEGS AND KNEES.[1]

By E. E. PRICE, M.D., F.R.C.S., F.R.A.C.S.,
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Bow legs and knock knees are among the commonest conditions for which the orthopædist is consulted. There is some difference of opinion concerning the importance of these defects and the measures to be adopted in treatment. The general thesis of this paper is that these deformities are most commonly due simply to an exaggeration of the normal posture, and can usually be managed by attention to simple rules.

Normal Posture.

A very casual observation of the posture of normal children will refute the suggestion that the legs should be straight, even in the limited cosmetic sense that applies to the adult. It will be found that posture varies with age. We can distinguish first a varoid phase and then a valgoid phase, which terminates in the cosmetically "straight" leg of the adult. It is of interest to note that these stages of posture are very faithfully represented by artists in their drawings of children. This conception is fundamental to a proper appreciation of the abnormal, and to a logical approach to treatment. It is necessary, therefore, to consider the development of normal posture in more detail.

Varoid Phase.

The varoid phase occupies the first two years of life. On analysis, it is found that the leg below the knee shows two variations from the adult: (i) an outward curve; (ii) an inward twist of the lower end.

This condition is present at birth and disappears under normal conditions before the age of two years. It is due to the shape of the bones, is probably an adaptation to the ovoid shape of the fœtus, and correction is the result of post-natal growth under normal conditions. It is to be noted that the deformity is in the leg bones, not the knee, and the term *genu varum* is inaccurate.

The foot is affected secondarily. When walking begins, the shape of the tibia directs the foot to the ground "intoed" and on its outside edge. There must therefore exist a compensatory valgus and abduction of the foot. This combination of *tibia vara* and secondary *pes valgus* might be termed a varus complex.

As a rule, this phase of posture development is not remarked by the parents, and indeed is not obvious unless looked for. It is most likely to be noted between the ages of twelve and eighteen months, that is to say, when the child first starts to walk. It is possible that the curve may actually increase at this period. Maximum limits may be set somewhat arbitrarily at half an inch of outward curve as measured between the medial surfaces of the knees and 15° of internal torsion.

Valgoid Phase.

Even during the varoid phase, it can be seen that the knee is technically valgoid, but it is obscured by the general shape of the leg.

Shortly before or after the age of two years, however, this valgus becomes apparent, partly by the straightening of the tibia, but more so because of increasing ligamentous laxity and consequent hypermobility of the knee joint. This hypermobility is quite marked and easily demonstrated by examination.

A similar state of laxity occurs in the foot, and there is consequently an associated *pes valgus*. This combination of *genu valgum* and associated *pes valgus* might be termed a valgus complex.

The degree of valgus is usually maximal at the age of four and a half years, when the malleolar separation should be not more than two inches recumbent or two and a half inches standing, the length of the leg from mid-patella to medial malleolus being eight inches. The foot should show a degree of valgus in proportion to the knees and should show a good arch when the

[1] Read at a meeting of the Melbourne Pædiatric Society on May 11, 1949.

valgus is corrected. These criteria are admittedly hard to define, but in practice it is not difficult to detect disproportionate knock knee or flat foot.

Having reached a maximum, the malleolar separation commences to diminish, and is unimportant by the age of six years. This is due probably to improvement in efficiency of the anti-gravity ligaments and muscles by normal growth and development. An important corrective influence seen sometimes, but not always, just prior to this age is the so-called "reactionary intoeing". This attitude derives from an internal rotation at the hip, and introduces a corrective stress in the leg which can be appreciated more readily by demonstration than by argument. The occurrence and significance of this attitude provide a clue to the management in the abnormal case.

These remarks can be expressed in the form of a graph (Figure I). This then represents the age-posture relationship from birth to six years. The normal condition cases lie within the area of the curve, and in such cases no treatment is needed at all. The essence of abnormality is that the condition should lie outside the curve, and the aim of treatment is to bring the condition within the curve. To disarm criticism, it might be as well to point out that the curve is highly idealized, and represents at best a statistical situation.

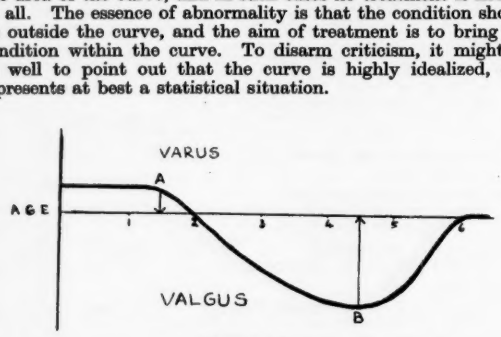

FIGURE I.

Age-posture graph. Base line is graduated in years. Ordinate is not to scale. Point A represents maximum normal varus deviation, that is, half an inch at the age of one and a half years. Point B represents maximum normal valgus deviation, that is, two inches at the age of four and a half years.

Bow Legs.

Clinical Features.

The clinical features of bow legs are well known. The deformity is in the leg, which is outward curved and inward turned. The outward curve of the tibia (O.C.T.) may be as much as one and a half inches, and the inward twist of the tibia (I.T.T.) may be 45° or even 60°. The foot shows a varying degree of *pes plano-valgus*. Sometimes there is noted a slight degree of *metatarsus varus*.

With remarkable uniformity, the children in these cases are between the ages of one and two years when first examined, but a few may present in the six months before and after this period. A few parents have noted that the baby was always bandy, but mostly it is observed first when the child begins to walk. The condition has often grown worse during the first six months of walking, but not invariably. It is also strikingly characteristic that the child is healthy, active and vigorous, and commonly very heavy, while walking is usually forward.

When the children are left to themselves, spontaneous improvement to some extent usually occurs, but this may be incomplete. In these persistent cases the children may be frankly bandy, but the usual defect is an unusually outcurved lower part of the tibia, so that the medial malleolus is very prominent. The principal trouble, however, is not the cosmetic effect in the leg but the condition of the foot, which remains abducted and valgoid. This flat foot frequently becomes painful later on and is, of course, then difficult to relieve.

The X-ray films show no characteristic changes. The metaphyses are strongly flanged on the medial side, and the cortex on the medial side is thickened.

Ætiology.

The ætiology must be admitted as uncertain. Some cases clearly have a familial basis. Rarely cases are found of varoid growth of the leg bones from local bone disease, such as overgrowth of the fibula, Blount's osteochondritis of the upper tibial epiphysis, osteomyelitis, or birth fracture, but these conditions are readily recognized and have no relationship to the common case. A few cases, otherwise identical, are due to florid rickets. Unless, however, we can conceive a type of subclinical rickets in which bones may bend without the X-ray changes of the disease, it is certain that rickets is not the common cause.

At this point, certain facts about the syndrome should be recalled: (i) the fact that the deformity is an exaggeration of the normal varus complex, and all intermediate degrees are found; (ii) the notable age incidence, corresponding with the normal varoid phase; (iii) the onset with walking; (iv) the type of patient—healthy, heavy, active and precocious in walking.

These facts suggest strongly that the condition is simply a pathological exaggeration of the normal varoid phase of growth and arises from the several stresses applied to the plastic growing bone at this period. These stresses are chiefly those of weight-bearing, but certain attitudes of sleep and play, which are characteristic of this age period, may apply a similar stress (Macnamara, 1947). The direction of the deformity depends simply on the fact that the tibia is already varoid at the age concerned.

The condition thus takes its place with the postural deformities, but with this difference, that bone is involved instead of muscles and ligaments. It has been stated that normal bone would not yield to anti-gravity forces, but normal and abnormal bone moulding is so commonly seen that it is difficult to see how such a statement could have originated.

If this conception is correct, two conclusions immediately follow:

1. Certain criteria are necessary to distinguish the abnormal, which differs from the normal only in degree or duration.
2. In any particular case, we can expect considerable improvement from natural causes about the age of two years.

Treatment.

In order to determine the degree of abnormality present and type of treatment required, we must consider the following factors.

1. The age of the patient. The approach of the second birthday indicates the waning of the chances of spontaneous recovery.
2. The family history. The fates of ancestors and siblings provide a good indication of the course of events in the patient.
3. The cosmetic effect. This is, of course, a matter of opinion, but it is usually easy to decide, and is of genuine importance to the patient and parents.
4. The severity of the deformity. The degree of secondary flat foot is hard to decide, but if severe flat foot is present, treatment is more urgent than otherwise. With regard to the degree of primary deformity, it is difficult to make measurements which are more than approximate, owing to the fatness and lack of cooperation of the patients. If the malleoli are firmly held together the separation of the knees can be estimated as equal to so many fingers' breadths, which indicates the outward curve. The inward twist can be rendered apparent by holding the foot in a plantigrade position. The angle between the line of the foot and the direction of the patella then provides an even more dubious estimate of the internal torsion.

Outward curves of less than half an inch and inward twists of less than 15° can be safely left to Nature. The cases in which treatment is required range from half an inch to one and a half inches of outward curve and up to 60° of torsion.

If interference is decided upon, we have a choice of splints or osteoclasis.

Splints.—Splints are preferable for use in the milder cases in younger subjects, young enough to have time to respond by the age of two years. Lateral pressure splints are difficult to apply effectively, since efficient pressure causes splint sores on the inner side of the knee. A modified Dennis Browne splint has proved much more satisfactory. The outward set of the splint is readily varied and controls the inward twist. The length of the bar controls the outward curve, by introducing a valgoid strain throughout the whole lower extremity. Increasing the length of the bar increases this strain, and it is usually seven to nine inches. Apart from these positive effects, there is the negative effect that when the splint is applied, the postural strains caused by weight-bearing, or habitual attitudes, cannot come into play. These splints are worn at night and for half the walking day, which means that the child has at least six hours for normal use of his limbs. Usually it requires six months of this régime to correct the deformity sufficiently, but

some times response is inadequate and then osteoclasis must be considered.

Osteoclasis.—The age of election for osteoclasis is two years. By this time hope for a spontaneous cure has become unreliable. Before this time splints may be enough, and after this time every month makes manual osteoclasis more difficult, as the bones grow more massive. Osteoclasis, then, is preferred in those cases, treated or untreated, in which there is sufficient deformity at the age of election. Correction of the rotation as well as the curve is, of course, essential. Above-knee plasters are applied over a layer of flannel bandage and left for eight weeks. Less may suffice, but the longer period renders disappointment most unlikely, and walking can be commenced at once. If we may judge from standard text-books, there is some tendency to avoid osteoclasis, but in a long series of cases there has been no disaster and no difficulty, except that with the older patients the bone may be too strong to break.

Knock Knees.

A great deal which has been said about bow legs can be applied, with suitable alteration of wording, to knock knees.

Clinical Features.

The predominant complaint is of the *genu valgum*. Sometimes the associated *pes valgus* is reported, occasionally falls or an awkward gait, and less commonly the reactionary "intoe". The age incidence is again striking; rarely noted before the age of two years, the condition reaches a maximum incidence at about three and a half years, and thereafter the numbers steadily dwindle. It is easy to show that the degree of knock knee behaves in a similar way to that already described for normal children, reaching a maximum at about four and a half years and then declining to some extent. Examination shows that there is an associated *pes valgus* of comparable degree, and that the deformity is the result of hypermobility in the knee and tarsal joints. In the older patients, it may be possible to demonstrate some elongation of the medial femoral condyle, indicating that some permanent bony change has occurred.

It is probable that the harmful effect of knock knees has been exaggerated by publicity. This is perhaps necessary so that parents will seek adequate advice, but the profession must maintain a balanced mind in prescribing treatment. There is no doubt that many children need none at all, since they would recover spontaneously. If the deformity should persist into adult life the knock knee or flat foot is cosmetically bad, and favours the onset of painful strains or osteoarthritis, but such a sequence is by no means inevitable.

Ætiology.

Knock knees may be due to injury, osteomyelitis, poliomyelitis, or other pathological process of a definite nature, but this is not so with the majority. These present the above-mentioned very homogeneous symptom complex, strongly suggesting that they are due to the same cause.

As with bow legs certain features of the syndrome should now be emphasized. Thus the deformity proves on analysis to be simply an exaggeration of the normal valgus complex. The age incidence also is that of the normal valgoid phase, and there is the same tendency to spontaneous improvement. We conclude, therefore, that the condition is simply an exaggeration of the normal valgoid phase, with a physical basis in an increased ligamentous laxity. Brittain (1948) reaches a similar conclusion. It is, therefore, a postural defect, and arises from the various intrinsic and extrinsic causes of any postural deformity. Thus in some cases there is a familial tendency. Some subjects are overweight, or unduly big, or show an endocrine imbalance. Some are asthenic, and especially important is the temporary asthenia due to convalescence from the infective illnesses common at this period. Certain positions are habitually assumed at play during this period and favour the valgoid posture (Macnamara, 1947). Nevertheless, there is often no very satisfactory reason to be found why ligamentous laxity should be increased.

From these arguments, as for bow legs, there follow two conclusions:

1. Certain criteria are necessary to distinguish the abnormal.
2. In any particular case, we can expect considerable improvement from natural causes by the age of six years.

Treatment.

We must therefore select patients for treatment, much as was necessary to do with the cases of varus complex. To do this we will take note of (i) the age of the child, (ii) the family history, (iii) the cosmetic effect and (iv) the severity of the knock knee.

The severity of the knock knee can be estimated by measuring the malleolar separation with the skin of the knees just touching. This can be done with the patient recumbent and then standing, the difference giving a measure of the ligamentous laxity present. To make measurements comparable at different ages and in different individuals, the length of the leg, say from the lower margin of the patella to the medial malleolus, is also recorded.

The limits of normality can be indicated by stating that the malleolar separation is maximal at the age of four and a half years, when it should measure not more than two inches with the patient lying down or two and a half inches when he is standing, with the distance from mid-patella to malleolus seven and a half inches. In abnormal cases it may be four to five inches, but is commonly three inches, or else the acceptable maximum is reached too early or retained too late.

If treatment is decided upon we may advise wedges, splints or osteotomy.

Wedges.—The idea behind the use of wedges is to throw the weight to the outer side of the leg and to initiate "intoeing". The value of "intoeing" is difficult to deduce mathematically, but can readily be verified by personal experiment. The ideal arrangement for this purpose is to place a one-quarter inch inside wedge on the heel only. The prolongation of the Thomas heel has no additional advantage in this connexion, and certainly does not support the arch, while wedging of the sole is a positive disadvantage. The effect can be enhanced by "floating" the heel half an inch medially. Wedged heels do no more than train the child to a corrective gait. They are therefore suitable for the young subject particularly, and in the moderate case. Rapid change is not to be expected, but this is quite all right so long as the child is maintaining normal progress. The whole point is so to manage the case that the knock-knee tendency has become negligible by the age of six years.

Splints.—Splints are not frequently needed in this condition, and are probably prescribed too frequently and too soon. This latter point is worth discussion. If for some reason splints are fitted at the age of, say, three years, the knock knee can be eliminated quite rapidly, but will recur if they are removed during the duration of the valgoid phase. To avoid this, the splints must be retained for a long time. It is better management, therefore, to hold one's hand. It will often then be found that wedges alone have been sufficient. If not, splints are applied during the winter of the year in which the child turns five. Six months at this time will correct any ordinary degree of knock knee—say one of three and a half inches of malleolar separation. More severe degrees admittedly may require earlier splinting. If splints are used in this way, the disconcerting relapse can be avoided. When relapse has threatened, or for older children with untreated conditions of moderate degree, the use of splints by night and wedge heels by day offers a useful compromise. This avoids the psychological stress of wearing splints to school, and will be found surprisingly effective, though over a longer period. The splint advocated is the Thomas knock-knee brace. The upper ends of the splints are connected by a posterior "britchen strap", which can be tightened if any undesirable degree of "intoeing" is induced.

Osteotomy.—Actually very few patients come to osteotomy, and especially so under the age of six years. The operation is necessary, of course, for older patients with knock knee requiring treatment.

Summary.

1. In the normal development of posture of the legs, there is a varoid phase to the age of two years and a valgoid phase to the age of six years.

2. The common cause of bow legs or knock knee is simply an exaggeration of these phases due to postural causes.

3. Criteria are necessary to determine which patient merits treatment.

4. The majority of children fall within the normal category and therefore need no treatment.

5. The abnormal posture requires management, rather than treatment, in accordance with certain simple rules.

References.

Macnamara, Jean (1947), "Preventive Orthopædics", THE MEDICAL JOURNAL OF AUSTRALIA, Volume II, page 717.

Brittain, H. A. (1948), "Genu Valgum", *British Medical Journal*, Volume II, page 385.

POSTURE FUNDAMENTALS.[1]

By Jean Macnamara,
Melbourne.

Posture may be defined as the relationship of various parts of the body to each other. When posture is good the relationship is such that the body functions easily and efficiently, performing work and movement with a minimum expenditure of energy. The attainment and maintenance of good posture in the erect position are not easy tasks for man, who challenges gravity more than animals and more than mobile machines in the ratio of

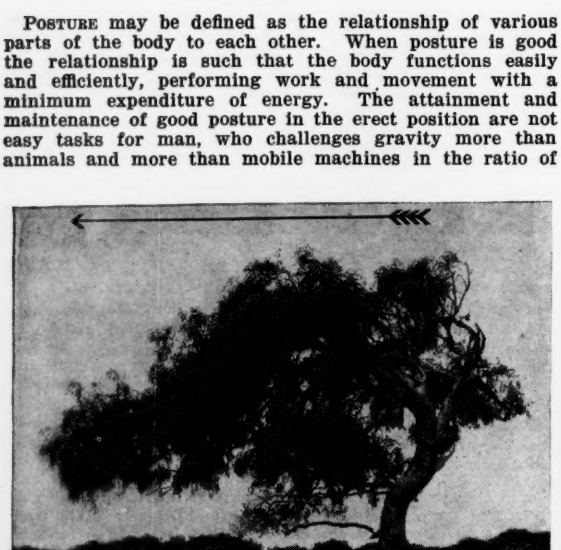

Figure I.

One of the horizontal trees of Greenough, Western Australia. Here strong winds are all from one direction—south of west (shown by the arrow). After a tree has grown a few feet above the level of the grass its top bends to the wind. (*Wild Life*, January, 1949.)

height to wheel-base of his framework or "chassis". In his book "The Action of Muscles" Sir Colin MacKenzie (1918) showed by illustrations how the erect posture has demanded more of certain groups of muscles of man than the task these muscles undertake in animals such as the bear, with his lower ratio of height to weight-bearing base.

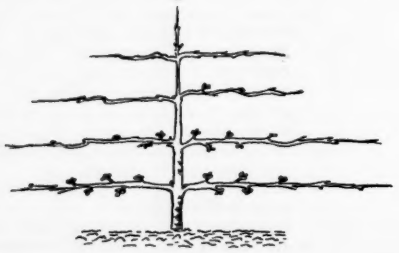

Figure II.

Espalier tree.

Man maintains erect posture by virtue of the tone of certain muscles which oppose gravity: the spinal muscles, the muscles of the abdominal wall, the extensors of the hips and knees, and, to a lesser extent, the calf muscles.

The way of life of modern civilized man, as also that which he imposes on his children, tends to reduce the tone of some of these valuable antigravity muscles: the hip extensors, the quadriceps, and the muscles of the abdominal wall.

[1] Read at a meeting of the Melbourne Pædiatric Society on May 11, 1949.

The tone and power of any muscle, normal or paresed, are reduced when the distance between origin and insertion of the muscle is increased for long periods. Conversely, the tone and power of a muscle are increased when the origin and the insertion are habitually approximated.

This law is the guiding principle in the after-care of muscles paralysed as a result of a lower motor neuron lesion. We favour recovery of the deltoid paralysed by poliomyelitis by protecting it from stretching. We favour recovery of the *tibialis anterior* by holding the foot in the position of inversion and dorsiflexion, keeping the *tibialis anterior* short. I have found that this law applies

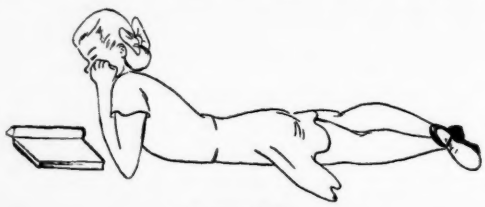

Figure III.

Girl reading book on floor. Note sway back and pressure on left maxilla.

with equal truth for the muscles of the child with cerebral palsy, and for the muscles of normal children who, for long periods, habitually assume positions which favour certain muscle groups at the expense of their antagonists. The antigravity muscles, which extend the hips and knees, have, as their antagonists, the flexors of the hips and the hamstring muscles. Unfortunately for man's posture, these antagonists are favoured by long-continued sitting, floor play and riding of tricycles. When the increased tone of the hamstrings and hip flexor muscles is long continued, relative shortening occurs.

Every good physiotherapist knows that it is impossible for her patient to attain good standing posture while the hamstring muscles are short. She does not worry him to correct his rounded shoulders until his hamstring muscles have regained their correct length and he has learned to stand with "tummy in", "tail tucked under", instead of standing with protruding abdomen, prominent buttocks and hollow back.

Figure IV.

Note internal rotation of legs on thighs resulting in pigeon-toed gait of children who select this position for long-continued floor play.

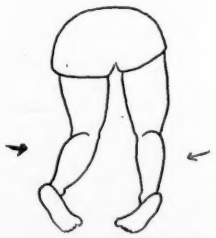

Figure V.

Rear view of child's legs and buttocks as she sleeps in prone kneeling position.

Alone among mammals, civilized urban man spends a large proportion of his waking hours using the small muscles of his hands, while his big antigravity muscles are handicapped by long periods of sitting.

In the infant posture is largely passive. It is important therefore that no factors should act in early life to make more difficult the task of the antigravity muscles when the baby stands and walks.

Two basic principles have helped me view the problem of the posture in the human young:

1. The form of any living, growing thing, be it plant or animal or child, is determined by three factors: (i) the inheritance which determines the habit natural for the species and the individual variations therefrom; (ii) the nutrition; (iii) the position habitually assumed.

2. The habitual assumption of any position is most potent in altering the line of growth from that predetermined by inheritance: (i) in early life, (ii) during periods of rapid growth, and (iii) when nutrition is poor.

When teaching, I have found that the importance of the factor "position habitually assumed" is stressed by using the abbreviation "P.H.A." and asking students to collect examples of its action. Trees exposed to wind from one

FIGURE VI.
Restraining bodice: front view.

direction show as grown trees the form into which the prevailing wind has shaped them as saplings (Figure I). The gardener uses "P.H.A." to alter the natural vertical growth of the young shoots of his pear tree to the horizontal arrangement of the espalier (Figure II). The Chinese women's feet retained in adult life the shape into which "P.H.A." had moulded them in childhood. The orthopædic surgeon alters the "P.H.A." in the correction of talipes. The thumb-sucking baby distorts the alignment of the maxillary incisor teeth as his thumb forces the developing teeth to assume an abnormal position. To confirm this observation, I sought the help of Professor A. Amies and Dr. E. T. Adamson, of the Faculty of Dental Science of the University of Melbourne, and learned from them another example of the effect of "P.H.A." on growing bone. A favourite position of children when lying face down to look at a book on the floor, or when reading in bed, is to rest the weight of the head on the palm of the hand. Thus weight is transmitted through the forearm to the elbow, which rests on the floor or bed. The palm of the hand is pressed firmly against the left (or right) maxilla. The mandible, being a movable bone,

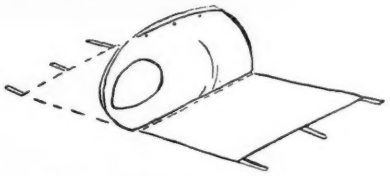

FIGURE VII.
Restraining bodice: side view. Note attachment of rear of bodice to anchoring cross band.

can accommodate itself to such pressure, but the maxilla cannot. This "P.H.A." is the cause of the distortion of one half of the upper jaw—the dental condition known as "crossed-bite".

This habit of using the floor as a book rest has another effect on growing children, resulting in sway-back. Turn Figure III from the horizontal to the vertical position and note how far behind the buttocks falls a line dropped from the shoulder blade region of the girl.

We can appreciate the influence of "P.H.A." by study of the toddler whose mother seeks advice because "he walks pigeon-toed". Occasionally a true *metatarsus varus* is thus described. More often the child's lower limbs appear normal as he stands, but as he walks "he plaits his feet", internally rotating the legs on the thighs at the knee joints. Given a train to tempt him to the carpet, he will sit with his feet curled under or around his buttocks, the legs being internally rotated on the thighs (Figure IV).

When asked to collect data about his position during sleep the parents will report that he sleeps prone with feet turned in, as shown in Figure V or Figure XII. When he is sitting on any of his chairs—high, push, or potty—or his "Shu-Fly Rocker", his legs take up the same position of internal rotation. In all these positions the medial hamstrings are favoured. The outer hamstrings are at a disadvantage. Correction of this common type of pigeon-toe is simple once the parents appreciate that the cause is the child's consistent selection of this position. The habit of sleeping prone can be corrected by a restraining bodice (Figures VI and VII). The habit of kneeling while sleeping can be corrected by applying a cardboard or "Presspahn" mould to the dorsal surface of each lower limb. "Presspahn 60" is electricians' insulating material, inexpensive and easily moulded by the mother (Figure VIII).

FIGURE VIII.
"Presspahn" mould.

Restoration of the balance between the outer and medial hamstring muscles is hastened if the biceps muscles are favoured as he sits. A chair can be adjusted by any handy man. First check that each chair, as well as the "Shu-Fly Rocker", is provided with a foot-rest at the correct distance from the thighs, deep enough to accommodate the feet. Attach to the foot-rest four pieces of wood, each pair providing a parking area for one foot. Set these so that the heels are near each other, the toes pointing out. When the outer hamstring muscles recover their tone the child walks with toes pointing forward.

When internal rotation is evident in one lower limb only, that limb has usually acted as a buttock cushion in an uneven crawl, the other limb serving as a propeller.

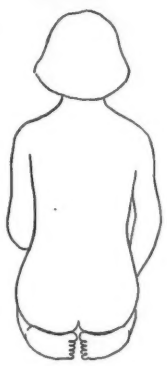

FIGURE IX.
The position selected for floor play by children with bilateral *metatarsus varus* or *talipes equinovarus*. Note feet curled under and around buttocks.

I have learned that in the correction of *metatarsus varus* and *talipes equinovarus*, efforts directed to the correction of the deformity of the foot are insufficient. Children with these deformities invariably select, for crawling, floor play and sleeping, positions which favour recurrence of the deformity and cause overaction of the medial hamstring muscles at the expense of the biceps (Figure IX). Thus the appearance of a satisfactory correction of the talipes is often spoilt by internal rotation of the leg on the thigh at the knee joint. This can be avoided if care is taken early to prevent constant favouring of the medial hamstrings.

It will be argued that normal children move about, that they constantly vary their positions. I agree that children, given space, freedom, fences to climb, gates on which to swing, and variety of interest, will vary their positions at short intervals. I would ask critics, before dismissing "P.H.A." as a factor in inducing knock-knees, bow-legs, and pigeon-toed walk, to observe little children sleeping and playing, to collect data from parents and to consider the conditions under which children before the fourth birthday spend many hours of a Melbourne winter. Among primitive peoples, and in days gone by in this country, there were older people with leisure to take care of the baby while his mother was busy—grandparents, aunties, nannies, mother's helps or older children kept a watchful eye to protect him from danger as he explored his home and its surroundings. Nowadays, few mothers have anyone to mind the baby while they shop or work,

and fearful of trouble with people with whom homes are shared or worried about danger for the baby, mothers can rarely allow the crawler or toddler to have the freedom of space, the chance to explore, and by this to strengthen his big antigravity muscles. The cooping process starts

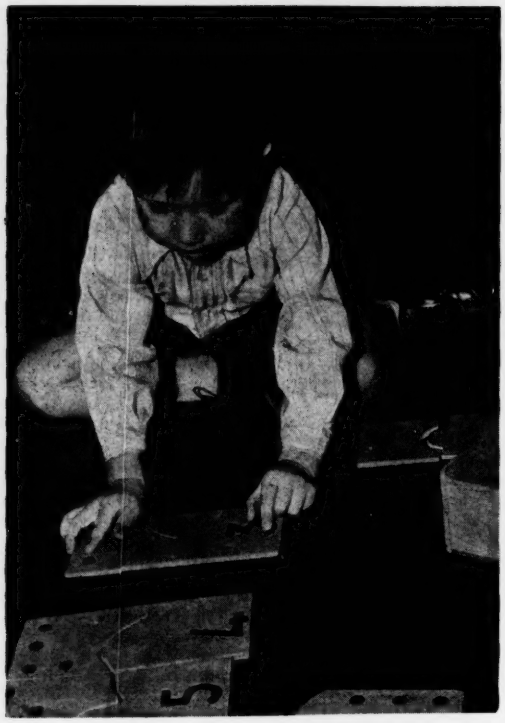

FIGURE X.

Boy, at kindergarten, arranging blocks on floor. The boy could have achieved his purpose just as well had the blocks been placed on a table or work bench. The internal lateral ligament of the left knee joint and its muscle guardians could have been spared this insult.

early, and the child whose ambition is to move and pull himself up, climb down again and move on to further exploration, after a few weeks of cooping in safety-cot or play-pen or tied in the perambulator or push-chair, makes the best of it by using his hands to play with little

TABLE I.

Good Standing Posture.	Poor Standing Posture.
1. The child stands at his full height.	1. The child stands in a slumped position.
2. He holds his head up and keeps his chin in.	2. The head is held forward, the chin protrudes.
3. The chest is held high; the child has good chest expansion.	3. The chest is flat; the child has poor chest expansion.
4. The abdomen does not protrude in front of the chest.	4. The abdomen protrudes.
5. The lower part of the back is almost straight; the scapulæ are not prominent.	5. The back is hollow; the scapulæ protrude.
6. The legs are straight, the knee joints flexed to only 5°.	6. The knees are hyperextended or are flexed more than 5°.
7. The child tucks his buttocks under	7. The buttocks protrude.
8. He takes weight evenly on both lower limbs	8. He often stands with more weight on one lower limb than on the other.

toys while the floor of the coop serves as a table. Mr. Price regards a small amount of knock-knee (two inches of separation of the medial malleoli when the knees just touch) as a phase through which all children pass, a stage of growth and development of the human race. Mr. Price's hypothesis would rest on a stronger foundation if we had evidence to show that the incidence of this degree of knock-knee is similar in the children of more primitive races, children whose parents do not provide carpets and little toys to be used on the floors of coops (Figure X).

Sir Arthur Keith (1918) considered that the structures most to blame for knock-knees of a child with rickets were the muscles, the guardians of the internal lateral ligaments of the knees joints: the *vastus medialis*, sartorius and

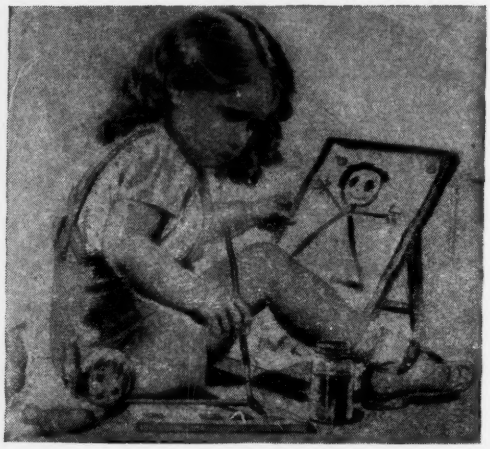

FIGURE XI.

Child with easel.

gracilis. I consider that the loss of tone of these muscles is the immediate cause of knock-knees of Victorian children, and that the loss of tone and strength follows long-continued stretching of these muscles by the positions which children habitually assume sleeping in the prone kneeling position, squatting and at floor play, and when riding tricycles. This was illustrated in a previous paper (Macnamara, 1947).

Study Figure XI and ask adults to comment. Few will remark that the child is forced to sit on the floor and use the floor as a table for paints. Her parents could have obtained an easel which she could use when standing or

TABLE II.

Good Posture Follows:	Poor Posture Follows:
1. Protection from deforming positions during infancy and early childhood.	1. Deformities or muscle imbalance induced by abnormal "P.H.A." during infancy and pre-school years.
2 Good general heath.	2. Poor general health.
3. Good nutrition.	3. Poor nutrition or badly balanced diet lacking adequate vitamins.
4. Adequate rest and sleep and freedom from fatigue.	4. Fatigue, insufficient sleep and physical work beyond his strength.
5. Freedom from infection.	5. Repeated infections: colds, sore throats, adenoids.
6. Good sight and hearing.	6. Defective sight or hearing.
7. Wearing easy-fitting clothes, well designed and fitted footwear.	7. Wearing badly fitting clothes, badly designed and ill-fitting footwear.
8. The use of furniture adapted to his size and a firm bed and mattress.	8. The use of forms, chairs, and desks too high or too low, floor play, a sagging bed.
9. Freedom for variety of movement and interest.	9. Cooping, lack of opportunity for varied exercises.
10. Happiness, confidence, vanity.	10. Discouragement, shyness.
11. Coaching and encouragement in the maintenance of good posture.	11. Lack of interest in or knowledge of good posture.

sitting. Adults have become accustomed to regarding the floor as the only table a child requires for his toys. Adults would resent for themselves the lack of such amenities as tables, work-benches, counters, stoves and

sinks raised above floor level. I suggest that the major factor in the production of bow-legs as described by Mr. Price is the "P.H.A." assumed during sleep (Figure XII) and floor play (Figures IV and IX), and that the incidence will fall when each infant welfare sister asks each mother at her visits after the seventh month: "Does your baby sleep chest down, napkin up? If so, I will show you how this habit can be corrected."

The medical examinations of the rural children at the Lord Mayor's Camps for Country Children held at Portsea last summer have made us realize that all is not well with a large number of Victorian children. While relatively few showed evidence of organic disease, the amount of dental caries appalled the dentists who gave their services, and the number of children with poor posture and early stages of crippling conditions has stimulated us to plan for better physique for the children who will attend the camps in years ahead.

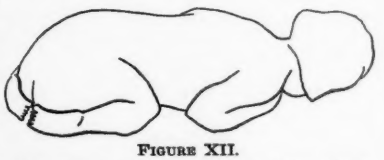

FIGURE XII.

Side view of baby sleeping face down with legs and feet curved around buttocks—the favourite sleeping position of babies who develop bowing and internal rotation of the tibiæ.

The solution of the problem is not the simple one of arrangement for more gymnastic work, more physical culture; it involves all the factors listed in Table II.

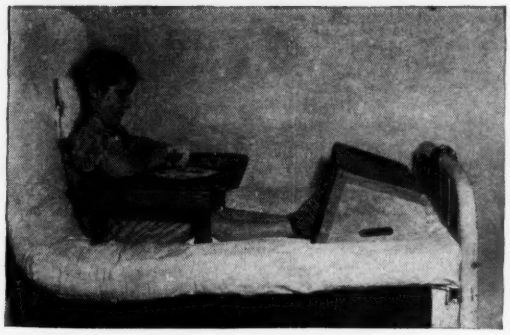

FIGURE XIII.

Back rest and small pad at head give correct support for normal spinal curves. Flexion is at hips with weight resting on ischial tuberosities. Play table of proper height supports arms and prevents slumping. (Note roll under knees and foot support.)

Too often one sees children, already pressed beyond their fatigue point, doing strenuous gymnastic work of a type which may be useful for an apprentice to a circus, but which does nothing to help a child improve his posture or increase his chest expansion. Between each bout of exercises the children slump, from fatigue and from lack of knowledge or interest in the maintenance of good body mechanics—sitting, moving, working, as well as standing. The gymnastic period ended, formal school work is resumed in desks which may or may not fit the children. In few schools is it anyone's responsibility to fit the desk to the individual child and thus to protect him from the deforming "P.H.A." which many are forced to assume.

Table I summarizes the contrast between good and poor standing posture in the school child. Table II summarizes factors inducing good and poor posture.

When a child is not well, muscle tone and activity are reduced. It is important, therefore, that the "chassis" should not be forgotten during convalescence or when treatment necessitates weeks in bed or repeated intervals of bed rest.

The child with asthma and the child recovering from acute rheumatism have sufficient handicap therefrom without the addition of unnecessary architectural handicaps which follow deforming "P.H.A." while receiving treatment.

Figure XIII demonstrates simple apparatus which, if generally used, would guard such children from trouble later from claw-feet, rounded backs, narrow chests and tight hamstring muscles.

If this brief consideration of posture, a subject which merits more attention than it receives in the medical curriculum, has aroused the interest of any doctor in his own posture, I would recommend for his guidance and entertainment the book "Exercise Without Exercises", by S. Arthur Devan, published by Methuen, London, in 1935 and 1938.

Acknowledgements.

I acknowledge with gratitude my indebtedness to Mr. P. Crosbie Morrison, the editor of *Wild Life*, for Figure I, the photograph of the Greenough tree; to the Commonwealth Director-General of Health, Dr. A. J. Metcalfe, for permission to reproduce Figure X taken from "Pre-School Centres in Australia"; to the Associated Banks (English, Scottish and Australian and National) and to the artist, Miss Nell Wilson, for permission to use Figure XI, the girl painting; and to the Joint Orthopedic Nursing Advisory Service, 1790 Broadway, New York City, for the photograph of a convalescent child and permission to reproduce it as Figure XIII.

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A REVIEW OF FIFTY CASES OF GASTRECTOMY FOR PEPTIC ULCER, WITH SPECIAL REFERENCE TO LOCAL ANÆSTHESIA.

By V. J. KINSELLA,
Sydney.

IN 1930 I had the good fortune to assist Finsterer when using local anæsthesia for gastrectomy, and I was most impressed by the patients' very good condition at the end of the operation, compared with the condition of patients who had had general anæsthesia.

The following review of 50 cases demonstrates what I believe to be the advantages of local anæsthesia for gastrectomy. Of these patients, 35 were in Saint Vincent's Public Hospital, 13 in Hornsby District Hospital, and two in Saint Vincent's Private Hospital. All my cases of peptic ulcer treated by gastrectomy from my beginning this work in public hospital practice up to December, 1948, are included in this series, except when an additional major procedure was carried out at the same operation. Six of the 50 patients had had previous resections or anastomoses, one had been explored and pronounced "inoperable", and three were operated on during acute hæmorrhage; associated disease was present in no less than 13 patients and included pulmonary tuberculosis, severe asthma, bilateral bronchiectasis (with several ounces of sputum daily), hypertension (two patients), rheumatic carditis (two patients), retrosternal goitre *et cetera*. Operation was withheld from only one patient who needed gastrectomy (Mr. E.B.). He had a purulent bronchitis, interstitial keratitis, coronary and cerebral vascular sclerosis.

In the selecting of patients for gastrectomy, it was considered that those patients were most suitable who had large penetrating ulcers. The more severe the organic change, the more satisfactory are the end-results. Besides the 50 patients submitted to gastrectomy there were 13 submitted to other operations. Three, with small ulcer, rapidly emptying stomach and high gastric acidity, were treated by vagotomy. Ten, with small ulcers, obstructed stomach and low or moderate gastric acidity, were treated by gastroenterostomy.

Age Groups.

The age groups of the 50 patients were as follows: twenty to thirty years, one; thirty to forty years, 10; forty to fifty years, 17; fifty to sixty years, 14; sixty to seventy years, eight.

Type of Ulcer and Sex Distribution.

The type of ulcer and the sex distribution are shown in Table I.

Table I.
Type of Ulcer and Sex of Patients.

Type of Ulcer.	Subjects.		
	Male.	Female.	Total.
Gastric	16	7	23
Pyloric	2	3	5
Duodenal	12	5	17
Multiple	4	1	5
Stomal *et cetera*	—	—	—
Total	34	16	50

Anæsthesia.

The type of anæsthesia used is shown in Table II.

Table II.
Anæsthesia.

Type of Anæsthesia.	Number of Cases.
Local only	21
Local and supplementary	25
Ether	1
Spinal	1
Combined forms	2
Total	50

Supplementary anæsthesia was found necessary under the following conditions: (*a*) early in the operation for the uncommon patient who was intolerant; (*b*) in the middle of the operation for the patient who was unduly distressed during some part of the intraabdominal manipulation; (*c*) late in the operation for the patient who was disturbed by the removal of the retractor and who is not easily relaxed by a repetition of the anæsthesia of the abdominal wall; most uses of supplementary anæsthesia are in the third group.

The supplementary anæsthetic was ether in the earlier cases, but later, "Pentothal", or less often, nitrous oxide, oxygen and curare were used.

Premedication was not heavy, and for the average adult consisted of "Nembutal" (three grains), morphine (one-quarter of a grain) and atropine (1/100 of a grain). The dose of morphine was usually repeated at the beginning of the operation. The patient usually altered position during the operation, thus avoiding too prolonged pressure on sacrum and calves, and at the end of the operation performed arm and leg exercises and deep breathing.

Results.

The results are as shown in Table III.

Table III.
Results.

Complications.	Number.	Percentage.
Death	0	0
Wound disruption	1	2
Severe respiratory complications	4	8
Mild gastric hæmorrhage	1	2
Duodenal fistula	1	2
High obstruction	1	2
Post-operative hernia	0	0

The duodenal fistula closed spontaneously. It was due to an obstructive band crossing the terminal loop of ileum. Four months later the band caused acute intestinal obstruction and the fistula reopened. The fistula again closed when the band was divided.

The high obstruction was due to a subhepatic abscess infection coming from the floor of the large saddle-shaped ulcer which was left in the liver and pancreas after the stomach had been removed. The patient was aged sixty-seven years, and had a blood pressure of 250 millimetres of mercury (systolic) and 120 millimetres (diastolic). The abscess was removed by suction, jejunostomy was performed, and the wound was closed without drainage.

Discussion.

The use of local anæsthesia (supplemented if necessary by light general anæsthesia) provides an important reason for the absence of mortality and the low incidence of complications in this series. This is suggested by comparable series of operations performed under general anæsthesia in Australia, in which mortality rates of 8·5% (Repatriation General Hospital, Concord) and 30% (Royal Melbourne Hospital) have been reported, with correspondingly high morbidity.

A higher mortality and morbidity rate may be expected with the use of general anæsthesia than with the use of local anæsthesia, for the following reason: Complications become more frequent as the period of deep general anæsthesia lengthens, and in upper abdominal surgery the plane of anæsthesia is deep. Gastrectomy under general anæsthesia thus becomes a struggle against time. But the struggle is unequal. A study of the reported series shows that the surgeon's speed does not forestall the high incidence of respiratory complications which he fears, and his haste is probably responsible for the leaks at suture lines, wound disruptions and herniæ. If he uses local anæsthesia, on the other hand, the surgeon need not hurry, and can thus achieve meticulous precision, ensuring success with the utmost certainty possible in surgery.

It is also important to note that, if excessive blood loss is avoided in gastrectomy, shock is not seen when local anæsthesia is used.

Finally, a tribute to the superiority of local anæsthesia comes from those surgeons who use general anæsthesia as a rule, but replace it by local anæsthesia for gastrectomy during acute hæmorrhage.

THE TREATMENT OF ACUTE LUMBAGO AND ACUTE LOW-BACK STRAIN IN GENERAL PRACTICE.

By James H. Young, M.D. (Adelaide), M.R.A.C.P.,
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Acute lumbago may be defined as an acute attack of pain in the lumbar region usually coming on without apparent cause.

Acute low-back strain is an essentially similar condition, the pain being brought on by trauma, usually a bending, lifting or twisting strain.

A distinction between these two conditions is often of academic rather than practical importance; for example, if the pain is first felt when the patient turns over to get out of bed, is the condition to be called lumbago or low-back strain due to a twisting injury?

Pathology.

It is reasonable to believe that the majority of attacks of acute low-back pain are due to disk lesions for the following reasons.

1. There is surgical proof that attacks of low-back pain are caused by disk lesions. These attacks may or may not be precipitated by trauma. Tears of the annulus and small disk protrusions have been observed at operation.
2. Ruptures of the cartilage plate and hæmorrhages into the disk have been observed at autopsy (Beadle, 1931) and some of the latter may have been spontaneous. It is conceivable that such lesions could cause attacks of low-back pain.
3. Radiological examination will reveal evidence of disk disease in some 30% of patients with a first low-back

strain (Young, 1948). Among patients with recurrent low-back strain the percentage is a little higher, and surgical experience teaches us that disk lesions occur at least twice as often as radiography would indicate.

4. The symptoms and signs in patients with acute lumbago and acute low-back strain can be explained by a disk lesion (Young, 1946). They cannot be explained by lesions of other structures.

5. The pain of acute lumbago and acute low-back strain is frequently relieved by epidural analgesia. After epidural injection of procaine there is often some analgesia in the fourth and fifth sacral and coccygeal segments, occasionally in the third sacral segment. Now the structures of the lower part of the back are mainly innervated by the fifth lumbar and first sacral nerves, so that it would appear that epidural analgesia does not abolish pain by blocking nerve roots but by anæsthetizing the lesion causing the low-back pain. The structures which are anæsthetized by an epidural injection of procaine are the posterior common ligament, the posterior part of the disk, the *dura mater*, the sheaths of the nerve roots, the periosteum, and that part of the capsule of the interlaminar joint in relation to the spinal canal. Acute low-back pain would therefore appear to originate in one of these structures and not in other ligaments or muscle. Failure of epidural analgesia to relieve pain does not indicate that the pain arises elsewhere than in a disk, for the pain may originate in a part of the disk not accessible to the local anæsthetic agent.

There is no justification for believing that the attacks of low-back pain commonly seen in practice are due to lesions of muscle, fascia or ligament until such conditions have been seen under the microscope and until precise criteria have been laid down for their diagnosis. That pains of muscular origin do occur in the back is not denied. Everyone knows that pain in the back may follow unaccustomed work. The lay public knows this pain well and it also knows that the pain will pass off in a few days at most. In fact it may probably be stated that, if low-back pain is severe enough or lasts long enough to make the patient seek medical advice, it is not muscular in origin.

Surgical experience has taught us that an attack of low-back pain associated with an acquired scoliosis is probably always due to protrusion of a lumbar intervertebral disk. The protrusion is usually on the convex side of the lumbar part of the spine. The patient adopts the scoliotic position to relieve pressure on the protrusion and to open up the space between the vertebræ on the affected side in order to facilitate reduction of the protrusion.

Surgical experience in sciatica has taught us that, if there is no acquired scoliosis, there will be a degenerated disk or only a tiny protrusion.

Acquired scoliosis would therefore seem to be the classical sign of protrusion, and absence of such scoliosis would seem to indicate that there is not a protrusion of any magnitude.

It is therefore probable that many attacks of low-back pain not associated with scoliosis are due to small tears in the posterior portion of the annulus, ruptures of the cartilage plate, hæmorrhages into the disk or tiny protrusions.

Diagnosis.

When a patient is seen complaining of acute low-back pain, whether apparently idiopathic or traumatic, we shall take an accurate history and make a complete examination to exclude general and visceral causes. In those patients in whom there appears to be local abnormality only we shall note especially two points.

1. Is there localized tenderness over an interspinous ligament? In order to elicit this tenderness the patient is laid face down with a pillow under the abdomen to flex the lumbar portion of the spine and open up the spaces between the spinous processes. Firm pressure is then applied over each interspinous ligament. In patients with acute low-back pain one or two ligaments will usually be found to be tender. In the absence of local bony abnormality this tenderness is, as far as I know, diagnostic of a disk lesion, and the presence of this tenderness will therefore determine the diagnosis.

2. Is scoliosis present, and, if it is, has it been acquired since the onset of the pain or has it always been present? Scoliosis due to shortening of one lower limb must be excluded. The presence of absence of acquired scoliosis will determine the type of treatment.

The Immediate Treatment of Attacks of Pain in the Back not Associated with Acquired Scoliosis.

It has been stated that attacks of pain in the back not associated with acquired scoliosis are probably due to small tears in the posterior portion of the disk, ruptures of the cartilage plate, hæmorrhages into the disk or tiny protrusions. Of these conditions, rupture of the cartilage plate and hæmorrhage into a disk could hardly be influenced by treatment, but it should be possible to anæsthetize a tear in the posterior portion of the disk.

Sicard (1901) noted that the pain of lumbago might be relieved by an epidural injection of cocaine. This was apparently forgotten until Cyriax (1945) reintroduced this method of treatment. He considered that the pain of lumbago was due to bruising of the *dura mater* as a result of protrusion of an intervertebral disk. That low-back pain sometimes originates in the dura seems certain, for example, in those cases in which the pain is aggravated by flexing the neck, or by dorsiflexing the ankle after straight-leg raising, movements which stretch the *dura mater*. But in many cases these movements do not aggravate the pain, and then it would appear that it arises in the posterior portion of the disk.

Epidural injection of 10 or 20 millilitres of 1% procaine solution will frequently give immediate and dramatic relief of pain, tenderness and limitation of movement in patients with acute low-back pain. Presumably it does so because it anæsthetizes a lesion in the posterior part of the disk or in the *dura mater*.

The injection can be given in the consulting room and the patient sent home to bed afterwards, though I much prefer to give it in the patient's own home or in hospital.

The skin over the sacro-coccygeal junction is shaved and sterilized with 1:1000 "Zephiran" solution.

About one and a half inches above the tip of the coccyx two small bony protrusions can be palpated, namely, the articular tubercles of the fifth sacral segments. They are about one centimetre apart, one on each side of the mid-line. Between them the superficial posterior sacro-coccygeal ligament can be felt covering the sacro-coccygeal foramen (Figure I). After preliminary local anæsthesia, a spinal needle is inserted at about an angle of 60° into this ligament. Slight resistance to the passage of the needle will be noted. When the ligament has been penetrated the needle will be felt to come up against the bony anterior wall of the sacral canal (Figure IIA). The needle is then withdrawn slightly and its direction changed. It is reinserted in a direction roughly parallel to the surface of the sacrum and it will be felt to travel up the sacral canal (Figure IIB). The stylet is removed, a syringe attached, and the piston withdrawn to make sure that the point of the needle is not inside the *dura mater*, in which case cerebro-spinal fluid would be aspirated. Ten millilitres of 1% procaine solution are then injected.

If the needle is in the correct position the fluid will flow in without force and there will be no external swelling. If the needle has been inserted superficially to the bone a swelling will appear under the skin in the mid-line. If the needle has been inserted alongside the spinous tubercles of the sacrum a swelling will appear in one sacro-spinalis muscle.

The needle is left in position for five minutes after the injection. If tenderness over the interspinous ligament has then disappeared the needle is withdrawn; if not, a further 10 millilitres are injected before the needle is withdrawn.

Recently I have treated 30 patients with acute low-back pain by this method and 23 of them have lost their pain, tenderness and limitation of movement within five or ten minutes after the injection. In another case there was only temporary relief after one epidural injection and

complete relief after a second. In the remaining six cases no relief was experienced.

In the successfully treated patients the acute pain did not return after the effect of the local anæsthetic agent had worn off, but there was then usually an ache lasting a few days. This is analogous to the relief obtained by injecting a local anæsthetic agent between the ends of a fractured rib—the acute pain goes and it is later replaced by an ache. This suggests that there is a difference between the effect of a local anæsthetic agent applied to the bare ends of an axis cylinder and of one which has to permeate the coverings of an axis cylinder to reach it.

Of the six patients in whom treatment was unsuccessful, one had an old crush fracture of the third and fourth lumbar vertebræ, so the acute low-back pain may not have been due to a disk lesion; the second had a lesion of the

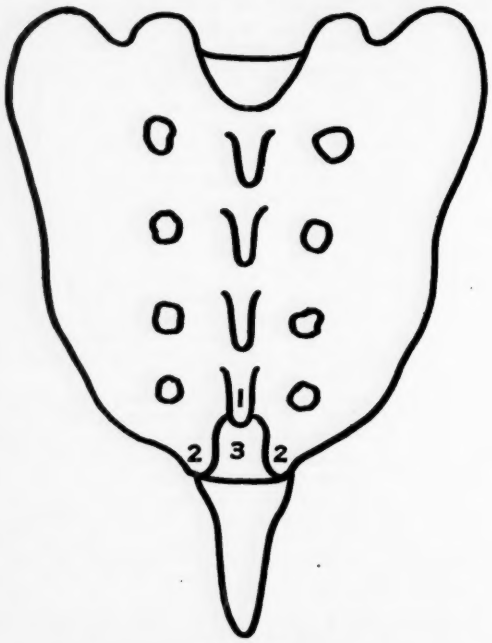

FIGURE I.

Posterior surface of the sacrum and coccyx. 1. Spinous tubercle of the fourth sacral segment. 2. Articular tubercles of the fifth sacral segments. 3. Superficial posterior sacrococcygeal ligament.

first lumbar disk (radiologically confirmed) and the procaine may not have reached the site of the lesion; the third had an attack of low-back pain of eight weeks' duration prior to injection; and the remaining three had recent attacks of low-back pain and showed radiological evidence of disk disease affecting the fourth and fifth lumbar disks.

Failure to relieve the pain by this method may therefore be due to an incorrect diagnosis (the attack may not be due to a disk lesion), inability of the fluid to reach the lesion (for example, a rupture of the cartilage plate or hæmorrhage into a disk), incorrect insertion of the needle, or too high a lesion. I have anæsthetized a lesion of the second lumbar disk (radiologically confirmed) by using 20 millilitres of 1% procaine solution, but have failed to anæsthetize a lesion of the first lumbar disk (also radiologically confirmed).

I prefer to keep the patient in bed for a few days after the injection, but perhaps this is not always necessary. It is preferable to use fracture boards under the mattress and a small support under the lumbar portion of the spine in order to maintain a lordotic posture, which relieves any strain on the posterior part of the disk.

The Immediate Treatment of Attacks of Pain in the Back Associated with Acquired Scoliosis.

It has been stated that attacks of pain in the lower part of the back associated with acquired scoliosis are nearly always due to protrusion of a lumbar intervertebral disk. The protrusion is usually on the convex side of the lumbar part of the spine. The patient adopts the scoliotic position to relieve pressure on the protrusion and to open up the space between the vertebræ on the affected side to facilitate reduction of the protrusion. This is the natural method of cure and we should assist this method.

In treating these patients I infiltrate the sacro-spinalis on the affected side with 50 millilitres of 1% procaine solution to paralyse the muscle and encourage further opening up of the space between the vertebræ on that side. In the usual case in which there is tenderness over the

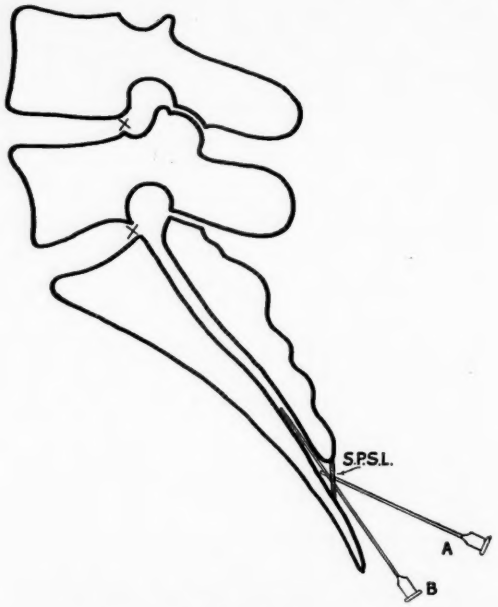

FIGURE II.

Technique of epidural injection. S.P.S.L. Superficial posterior sacrococcygeal ligament. A. Needle inserted through the ligament and impinging against bone. B. Direction altered and needle inserted into the sacral canal. X. Common sites of lesion in acute low-back pain.

fourth or fifth interspinous ligament 20 millilitres are injected opposite the fifth space, 20 millilitres opposite the fourth space and 10 millilitres opposite the third space. Patients frequently feel faint after this injection, and some premedication, for example, one and a half to three grains of "Nembutal", is advisable. Traction is then applied to both lower limbs, six to ten pounds on each leg. This traction is opposed by contraction of the sacro-spinalis on the sound side, but not by the paralysed sacro-spinalis on the infiltrated side. In theory, the vertebræ should then separate a little more on the affected side, thus allowing the protrusion to reduce itself. Fracture boards are not used. On the contrary, the head and shoulders are slightly raised on pillows to flatten the lumbar portion of the spine and open up the space between the vertebræ posteriorly.

Fifteen patients were treated by this method and all recovered. The pain, deformity and limitation of movement disappeared in an average period of four days; in many cases in two days (Figures III and IV). Recovery, of course, may have been due to the rest in bed, but many of the patients who were treated by this method had had preliminary bed rest before treatment was started. Recovery

may also have been due to the traction, but some patients had had unsuccessful traction before local anæsthesia was used. I believe, therefore, that recovery is accelerated by the local anæsthesia.

Recently I have been using epidural injection of procaine to supplement this treatment, as it helps to relieve the pain.

Once the scoliosis has disappeared it is assumed that the protrusion is reduced, and there is then no necessity to continue traction. On the contrary, it is contra-indicated because it may separate the vertebræ. It is

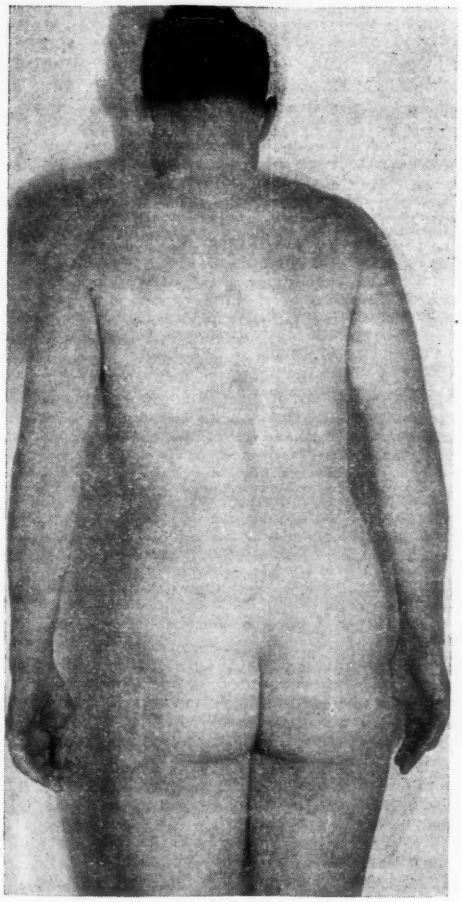

FIGURE III.
Patient with acute low-back pain and scoliosis before treatment.

now preferable to use fracture boards under the mattress and a small support under the lumbar portion of the spine to maintain a lordotic position and relieve any strain on the posterior part of the disk.

After-Treatment.

It has previously been pointed out that in over 30% of patients with acute low-back strain radiological examination will reveal evidence of disk disease and that disk lesions occur at least twice as often as radiography would indicate. Many attacks of acute low-back pain must therefore be preceded by disk degeneration, and in fact there is often a previous history of backache in these cases. We know also that disk degeneration may follow an attack of acute low-back pain.

After relief of the first type of low-back pain by epidural local anæsthesia and rest, and of the second type by infiltration of the sacro-spinalis with a local anæsthetic agent and traction, there remains therefore the problem of the degenerated disk.

The degenerated disk is excessively mobile. It is a loose joint and it should be supported. These patients should therefore be fitted with an adequate support before being allowed up. A "Berlei" support, number 81 or 480, is very satisfactory for males and number 427 or 441 for females.

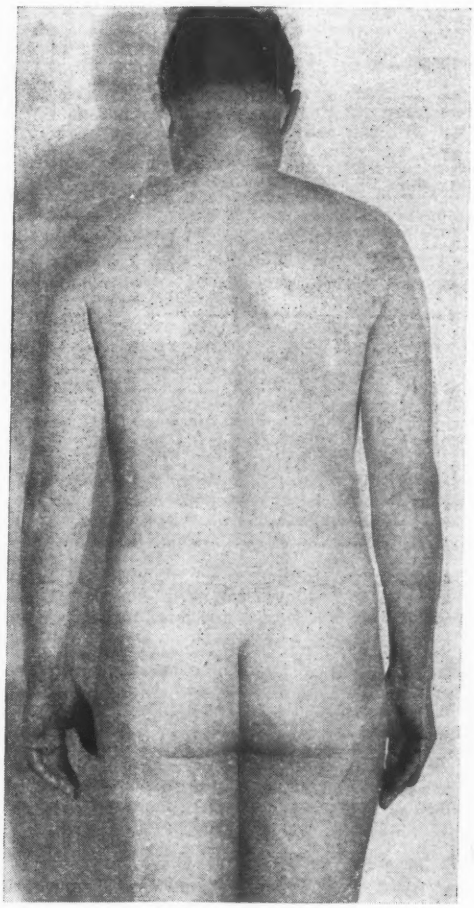

FIGURE IV.
Same patient as in Figure III after treatment by infiltration of the right sacro-spinalis muscle with 50 millilitres of 1% procaine solution followed by traction applied to the lower limbs.

Exercises are prescribed to strengthen the sacro-spinales and glutei. Twice a day the patient lies face down on the floor with a firm pillow under the abdomen. Each lower limb in turn is raised off the floor by the patient's extending the hip, the knee being kept straight. This will contract the sacro-spinales and glutei. The head and chest are raised without use of the arms. This will contract the sacro-spinales. Each exercise is performed some twelve times in the morning and again in the evening.

The patient wears the support for at least three months and continues the exercises indefinitely. Bending and lifting should be avoided when possible, and when the patient has to lift something he should do so by flexing

at the hips and knees and not by flexing the back. Until we know the cause of disk degeneration preventive treatment will be impossible.

The management of those patients who develop a root pain in the lower limb is outside the scope of this paper.

Summary.

Attacks of acute low-back pain, whether idiopathic or traumatic, are usually due to lesions of a lumbar intervertebral disk. Such attacks are of two types: those with and those without an acquired scoliosis.

Attacks of acute low-back pain without scoliosis are usually rapidly relieved by an epidural injection of procaine. Of 30 patients thus treated, 23 have had immediate relief of pain, tenderness and limitation of movement.

Attacks of acute low-back pain associated with acquired scoliosis are usually relieved by infiltration with procaine of the sacrospinalis on the convex side, followed by traction. Fifteen patients so treated have lost their pain, deformity and limitation of movement in an average period of four days.

After-treatment with a support and exercises is necessary in both types.

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ACUTE PORPHYRIA, WITH REPORT OF TWO CASES.[1]

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ACUTE PORPHYRIA is a condition considered by many authors to be not so uncommon as was once thought (Nesbitt, 1944; Chandler, Harrison and Rimington, 1939). Certainly if one is unacquainted with its bizarre clinical manifestations it is easily overlooked. The last report of this condition in this journal was that of Derrick (1946). Two cases occurred last year at the Royal Adelaide Hospital within a little over a month of one another and were thought worthy of a further report.

Historical Review.

An historical review is of help in understanding this condition—for a full review Nesbitt's informative article (1944) should be consulted.

In 1841 Scherer described a red pigment formed by the action of sulphuric acid on hæmoglobin. This substance was investigated later by Hoppe-Seyler, who called it "hæmato-porphyrin". Garrod (1892) stated that hæmatoporphyrin occurred in the urine of healthy persons in small amounts, and that larger amounts occurred in the urine of patients who had a great variety of diseases. Günther (1911) first recognized the disease entity of porphyria, for he described patients who excreted so much red pigment that the urine was coloured—a condition he called "hæmatoporphyria". He believed it was a clinical entity due to a constitutional anomaly of pigment metabolism. In 1924 Fischer demonstrated that patients with this disease excreted excess coproporphyrin and uroporphyrin, but never hæmatoporphyrin, which was a laboratory product never found in nature. For this reason the term "porphyria" has now supplanted the original "hæmatoporphyria" of Günther.

The porphyrias have been classified as congenital porphyria, acute porphyria and chronic porphyria. We are here concerned with the condition of acute porphyria, which is characterized by the presence of excessive uroporphyrin III in the urine in most cases. Occasionally, however, uroporphyrin I or coproporphyrin III may be excreted in excessive amounts and not uroporphyrin III (Nesbitt, 1944; Abrahams, Savey and Maclagen, 1947). Chronic porphyria is probably only a mild form of the other forms and not a distinct entity (Nesbitt, 1944). Excessive uroporphyrin I is, however, characteristic of congenital porphyria.

Diagnosis of these conditions therefore rests on the demonstration of excess of these pigments in dark red or port-wine coloured urine. This is generally done spectroscopically. Concentration methods usually have to be employed first. These methods depend on the extraction of the pigments with amyl alcohol. But the urine of patients with acute porphyria has long been known to give a strong reaction with Ehrlich's aldehyde reagent. Waldenstrom (1937) first showed that this reaction was due, not to urobilinogen, but to a quite distinct chromogen which he called "porphobilinogen". Watson and Schwartz (1941) reported the results of their investigation of five cases of acute porphyria. In four cases the urine was red-brown, becoming darker on exposure to light; in one case the fresh urine was normal in colour, giving a strong Ehrlich reaction, but after having stood in the light for several days the urine went deep reddish-brown, containing zinc uroporphyrin and reddish-brown porphobilin. Waldenström pointed out that porphobilinogen is much less soluble in organic solvents than is urobilinogen. This property was made the basis of a simple test by Watson and Schwartz as follows:

> Equal parts of urine and Ehrlich's reagent (0·7 gram p-dimethylaminobenzaldehyde, 150 cc conc. HCl; 100 cc distilled water) are mixed in a test tube. To this mixture is then added an equal volume of a saturated aqueous solution of sodium acetate. A few ccs of chloroform are then added and the solution thoroughly mixed. The aldehyde compound of porphobilinogen remains in the aqueous fraction while that of urobilinogen is completely extracted by the chloroform.

This test has been found reliable in distinguishing porphobilinogen and urobilinogen. Its peculiar value is the positive result produced in urine of normal colour before the porphyrin pigments can be shown spectroscopically.

The presence of porphobilinuria can be considered as pathognomonic of acute porphyria (Watson and Schwartz, 1941). The ætiology of acute porphyria is obscure: it can best be regarded as an inborn error of metabolism—a view supported by the familial nature of the condition (Nesbitt, 1944). For a full discussion of the porphyrin pigments the reader is referred to the full review by Dobriner and Rhoads (1940).

Reports of Cases.

The clinical records of the two cases mentioned will now be given.

CASE I.—A married woman, aged twenty-seven years, was admitted to the Royal Adelaide Hospital with the provisional diagnosis of bleeding ectopic gestation. She had been examined by a private doctor, who stated that she had had abdominal pain for thirty hours—continuous, but with exacerbations. Her pulse rate was 80 per minute. Her current menstrual period was two weeks overdue.

On her admission to hospital the patient was described as a young woman groaning and rolling around in bed with pain. Her blood pressure was 100 millimetres of mercury, systolic, and 65 millimetres, diastolic. The result of subsequent vaginal examination was considered to exclude any gynæcological cause for the condition, though the uterus was considered slightly enlarged.

The patient was later transferred to a medical ward. She continued to complain of severe abdominal pain, rolling around and groaning continuously. However, it was noticed that the abdomen was soft to palpation and free from

[1] Included in a thesis accepted for the degree of doctor of medicine by the University of Adelaide.

local tenderness. Her pulse and respiration rates remained normal.

Treatment consisted of the intramuscular injection of three grains of sodium phenobarbitone every eight hours when required for restlessness, and fluid administration with the intravenous exhibition of glucose and saline.

Two days after her admission to hospital the patient was looking and feeling much better. Two days later again she was rolling around with pain as she had before. It was now thought that there was a large psychological element in her condition. However, her condition further deteriorated, she became cyanosed and her complaints ceased.

At this stage her blood pressure was 75 millimetres of mercury, systolic, and 50 millimetres, diastolic, and her respiration was very rapid. X-ray examination of the chest revealed no abnormality, but the white blood cell count was 22,000 per cubic millimetre, 90% being polymorphonuclear cells; a pronounced shift to the left was present. She was started on a course of penicillin, 100,000 units every three hours.

Next day she was much better, but the following day her condition again deteriorated and laparotomy was performed. It revealed no abnormality apart from an enlarged uterus of a size compatible with a two-months' pregnancy.

Soon after this the possibility of acute porphyria was suggested. The patient gave a history of passing dark urine intermittently for some years, and said that her urine was dark before her operation. On examination at this stage her urine was of normal colour; but a positive result was obtained to the Watson-Schwartz test for porphobilinogen. The test was repeated with equivocal results for the next four days, but after this another positive result was obtained. The urine was still of normal colour and porphyrin pigments could not be demonstrated spectroscopically.

The patient's condition now slowly but steadily deteriorated, her mental condition being particularly affected. She became progressively demented, crying and moaning continuously, with progressive loss of memory, disorientation and then clouding of consciousness. She exhibited perseveration—for example, she used to say "dock-ter, dock-ter" continuously. By now her urine was of the classical port-wine colour at times, but not continuously. On the day of her death porphyrin pigments were demonstrated spectroscopically and pink fluorescence was produced by ultraviolet radiation.

The patient died eight weeks after her admission to hospital. Post-mortem examination, performed by Professor J. B. Cleland, revealed the following significant findings. The liver was nearly black. The marrow of the sternum, vertebræ and ribs was coffee-coloured. There was a small placenta but no fœtus in the uterus. Examination of sections of various organs, including the liver, revealed no significant abnormalities.

The clinical diagnosis in this case was suggested by observation of a previous case. However, the diagnosis of this case was not made till after death, by demonstration of the presence of porphyrin pigment in the urine. The record of this case is as follows.

CASE II.—A married woman, aged thirty years, was admitted to the Royal Adelaide Hospital with a history of abdominal pain, vomiting and weakness. Prior to this she had been under observation for a fortnight in a country hospital for these same symptoms. During this period she had had a slight discharge *per vaginam*; on examination her uterus was found to be enlarged to the size of a six-weeks' pregnancy. Her condition was improving when she suddenly developed retention of urine necessitating catheterization. It was at this time that her urine was first noticed to be wine-coloured. The next day the patient complained of paralysis of the legs; but although she was noticed to be looking "toxic", with sunken eyes and sordes on the lips, this paralysis was considered to be probably hysterical. She cried and moaned all that night.

On her admission to the Royal Adelaide Hospital the patient stated that she thought she was pregnant. She volunteered the information that she had not taken any abortifacient, as she did not mind being pregnant. She also gave a history of her husband's infidelity. She complained that her legs and arms were useless, though her bowels and bladder acted normally. She had some central abdominal pain as well.

On examination of the patient, she was described as immobile from the neck down, speaking only in a whisper, though she could speak more loudly. Every now and then she went into queer phases of gross overbreathing and performed complicated tongue movements, saying that she "was getting the scabs off". Her pulse rate was 116 per minute, her respirations numbered 36 per minute, and her blood pressure was 90 millimetres of mercury, systolic, and 75 millimetres, diastolic. She had a harsh systolic murmur, heard best at the lower end of the sternum. Examination of her abdomen revealed no tenderness or rigidity. Her limb reflexes were sluggish. She could not move her limbs; it was considered that this paralysis was hysterical.

The next day the patient was noticed to be cyanosed and still exhibiting the periods of overbreathing. She developed retention of urine requiring catheterization.

Her condition deteriorated rapidly. She began to show signs of mental deterioration with similar perseveration ("dock-ter, dock-ter") to that exhibited by the patient in Case I.

In the fear of possible poliomyelitis (the diagnosis of acute porphyria not having been made), lumbar puncture was performed, with a normal result. The patient died rather suddenly next day—five days after her admission to hospital.

Intermittently she passed the wine-coloured urine of acute porphyria. This occurred more often than in the previous case, but the urine was of a lighter, more pink colour.

Post-mortem examination was performed by Professor J. B. Cleland with the following significant findings. Sharply circumscribed patches of staphylococcal bronchopneumonia were present. The liver and kidneys were deeply congested. The urine was tomato-pink; porphyrin pigment was subsequently demonstrated in it spectroscopically.

Discussion.

These two patients, in spite of their different presentation, were strikingly similar in appearance. This similarly was commented on by all who saw them, including the nursing staff. They both lay immobile in bed, with sunken eyes and dark shadowy complexion; in both there was an unshakable belief in impending death. As they became worse the way in which each cried out "dock-ter, dock-ter" could be described only as identical.

The cases indicate that the diagnosis of acute porphyria must be considered in the case of women, aged from twenty to forty years, with three symptoms which may occur together or separately. These are: (i) acute abdominal pain, (ii) intermittent passing of dark urine, (iii) generalized paralysis.

1. It is not difficult to understand why so many of these patients come to laparotomy, as in Case I. There is the combination of persistent abdominal pain with exacerbations together with a very "toxic", shocked appearance, in association with definite leucocytosis. The only clinical lead to the diagnosis may be the association of peculiar hysterical features with such a toxic condition. Examination of the urine for porphobilinogen in the way described will reveal the diagnosis, though, as Case I shows, the test may not give a positive result with every sample of urine. This fact makes the management difficult; probably a laparotomy will be the only way out in many cases.

2. Intermittent passing of dark urine has many causes. Renal colic may be closely simulated if abdominal pain is present as well. However, a history of the intermittent passage of dark urine is by no means invariable in these cases. If it is present, it may be of help in the differential diagnosis of acute abdominal pain.

3. Generalized paralysis is often difficult to diagnose, especially in women. Generalized polyneuritis, widespread poliomyelitis or cervical myelitis due to various causes may be difficult conditions to differentiate from hysterical paralysis. In these cases of acute porphyria an hysterical colouring is common, so that the condition is easily overlooked, as in fact it was in Case II. The condition has therefore always to be borne in mind.

Confirmation of a provisional diagnosis of acute porphyria can be sought by carrying out the Watson-Schwartz test for porphobilinogen. Using this test, Nesbitt (1944) was able to uncover latent porphyria in a sister and paternal cousin of a patient who died of acute porphyria. Neither had had any severe episodes. Spectroscopic examination of the urine for porphyrin pigments is only a gross test and is unlikely to give positive results in normally coloured urine. Chemical extraction of the pigments is the next way to confirm the diagnosis (Nesbitt, 1944), but was not possible in these cases.

Treatment of the condition, whether latent or acute, is largely confined to avoidance of drugs which may exacerbate it, especially sulphonamides and barbiturates, but also sulphonal arsenicals, alcohol and compounds containing phosphorus or lead (Dobriner and Rhoads, 1940). Kaolin was tried by Abrahams *et alii* (1947) with no definite effect.

The cause of death in this condition is by no means clear; respiratory failure could be invoked in Case II, but this is not adequate for all cases. The shocked condition shown in Case I was also exhibited in a case reported by Abrahams *et alii* (1947). These observers found electrolyte changes suggestive of adrenal cortical deficiency in their patient, and they suggest that this may well contribute to death in these cases. Nesbitt (1944) mentions that in association with the pigmentation not uncommonly shown by patients suffering from acute porphyria, an Addisonian crisis may be closely simulated by such an acute exacerbation of acute porphyria.

Summary.

Two cases of acute porphyria are reported and the clinical and biochemical features of the condition are briefly reviewed.

Acknowledgements.

The writer is indebted to Dr. G. A. Lendon, the honorary physician under whose care these patients were admitted to the Royal Adelaide Hospital; to Dr. J. W. Rollison, medical superintendent of the Royal Adelaide Hospital, for permission to report these cases; to Dr. E. C. Hallett, formerly house physician to Dr. Lendon, for help with the clinical record; and to Miss M. Freeman, biochemist to the Institute of Medical and Veterinary Science, Adelaide, for the biochemical investigations.

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ENTEROCELE.[1]

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BUEERMANN of Portland (1932) holds that whenever a relatively rare clinical entity is of such a nature as to be readily confused with one of commoner occurrence, an enlightened clinical surgical judgement results from an analysis of their differential signs and symptoms. Posterior vaginal hernia, or enterocele, presents such an entity, the condition with which it is often confused being the commoner rectocele.

[1] Read at a meeting of the Section of Obstetrics and Gynæcology of the New South Wales Branch of the British Medical Association on September 15, 1948.

Enterocele, or hernia through the pouch of Douglas, is not so common as cystocele or rectocele, but its recognition is of great importance surgically. It appears in the literature under a variety of names—namely, cul-de-sac hernia, pouch of Douglas hernia, recto-vaginal hernia, posterior vaginal hernia and high rectocele. Some writers state that the true "posterior vaginal hernia" is a definite peritoneal sac with a neck, and distinguish it from "enterocele", in which there is prolapse of the uterus accompanied by a bulging of abdominal contents into a distended cul-de-sac of Douglas. However, in each case there is eventually a peritoneal sac pushing down from the pouch of Douglas in the mid-line and dissecting between the rectum and vagina. The neck of the sac is located between the utero-sacral ligaments just behind the top of the vagina, and through this abdominal contents pass to form a mass which may bulge out through the vulva when the patient strains. The term "high rectocele" is a bad one and should be discarded when this condition is under consideration, for it is not a rectocele, its contents being either small bowel omentum or fluid, but not rectum.

The floor of the pelvis, as Thompson has noted, is a thick compact mass traversed by clefts or vaults, the walls of which are normally in contact, but they open to allow material to pass through. Symington stated that in the mesial plane the floor of the pelvis is, as a rule, about 2·5 centimetres thick. In the lateral plane it varies, but is always thicker than in the medial plane; near the lateral pelvic wall it is from 5·0 to 7·5 centimetres thick. Muscles and their fascial coverings compose this floor, the most important being the *levatores ani* and the coccygei muscles. The *levator ani* arises from the posterior surface of the *os pubis*, and its fibres pass backwards lateral to the urethra, vagina and rectum, to their insertion into the sacrum and coccyx. Fibres passing across between the urethra and vagina and the vagina and rectum constitute the pubo-urethralis and pubo-vaginalis tissue respectively. Congenital weakness or absence of these intercommunicating fibres provides the predisposing condition in the development of vaginal hernia in the event of severe strain. Such a strain comes during pregnancy, when the tissues of the pelvis become lax and congested, and the trauma of delivery is superimposed. From a consideration of the relative strength of the floor of the pelvis in its median and lateral portions, it will be readily seen that these herniæ are likely to occur in the middle line and rarely on either side.

Three classes of enterocele are observed: (i) those occurring in virgins and *nulliparæ*, (ii) those occurring in *multiparæ*, (iii) those following surgical measures.

In the nulliparous patient, when no other cause for prolapse exists, an abnormally deep cul-de-sac, a congenital defect, with intraabdominal pressure directed against it, may cause so much traction on the posterior surface of the cervix and on the anterior wall of the rectum that prolapse of the uterus, the rectum and the anteriorly attached bladder follows. By this mechanism, a congenitally deep cul-de-sac of Douglas may be responsible, in most cases, for the so-called nulliparous prolapse.

During pregnancy the tissues of the pelvis become lax and congested, and they are then subjected to the trauma of labour. Stretching or tearing of the thinned-out recto-vaginal fascia during parturition (especially if operative delivery is required) causes a hernial sac to appear, and with the passage of time this increases in size.

Vaginal hernia is sometimes seen as a post-operative complication following the operation of vaginal hysterectomy for the treatment of prolapse. Failure to close and completely obliterate the cul-de-sac is the reason, and care must be taken when this operation is performed to approximate the utero-sacral folds to each other in their entire length. This will act as a barrier against recurrence. If a small enterocele is present and is overlooked at the time when the vaginal hysterectomy is performed, it will reappear.

SYMPTOMS.

The symptoms of vaginal hernia are usually those of a rectocele and are not as a rule characteristic. The patient

complains of a bearing down sensation and the feeling of a mass in the vagina. If the hernia is large she may complain of difficulty in getting about because of the pain in the hernial sac. She may complain of a mass bulging through the vaginal outlet when she stands or strains, and coughing may aggravate her symptoms. The supine position causes a spontaneous reduction of the hernia with relief of symptoms. Urinary symptoms may be present from the associated cystocele.

SIGNS.

The size of the hernia determines vulval protrusion. A rectocele and cystocele may be found in association with the enterocele, and as the majority of the patients have been pregnant, perineal laceration may be an associated finding, as may varying degrees of uterine prolapse. No difficulty will be experienced in the diagnosis if the sac is large and contains omentum, small bowel or fluid, or all three. The feeling of a mass in the vagina, gurgling of the intestine in the sac and collapse of the sac by reduction of its contents into the abdominal cavity are truly diagnostic signs which differentiate enterocele from rectocele and vaginal cyst.

After reduction, if the patient is asked to cough a distinct impulse will be felt as the contents are forced back into the sac. Frequently enterocele and rectocele occur in the same patient, although either may occur independently. When both conditions are present the line of division can frequently be distinctly seen as a transverse depression above the rectocele.

Rectal examination with the finger will demonstrate that the soft bulging mass protruding from the posterior vaginal wall is only partly caused by the anterior bulging of the rectal wall, and that there must be a superimposed sac. This can be definitely established by having the patient give a short, quick cough during the digital examination. A protrusion independent of an associated rectocele will then be demonstrated.

In all cases in which extensive cystocele and rectocele are present and in all cases of uterine prolapse, I have never been satisfied to examine the patient only in the lithotomy position. Many years ago my senior, the late Cedric Bowker, impressed on me the necessity for examining all patients with this trouble in the standing position; his method was to have the patient stand with one foot on the floor and one on a stool. The patient is then asked to strain, and any protrusion at the vulva is inspected and then digitally examined. I am certain that one is less likely to overlook a condition of prolapse if one makes this examination with the patient in the upright position as a routine procedure.

DISCUSSION.

In an operation for rectocele, as part of an operation for procidentia, the overlooking of an enterocele is frequently the cause of a recurrence in the posterior segment while the bladder and uterus frequently remain in good position.

The pioneer work of George Gray Ward (1922) is always referred to when the question of enterocele is under discussion, and I make no apology for quoting him frequently in this short paper. In 1922 he wrote as follows:

> A careful study of the cul de sac of Douglas in all cases of prolapse of the uterus during the past five years has convinced me that an enterocele, either beginning or well developed, is present in a far larger proportion of those cases than we have realized and that it is necessary to meet this condition with an appropriate technique at the time of the operation for the cure of the prolapse of the uterus in order to prevent a certain proportion of partially satisfactory results. I am also convinced that enterocele (of the lesser type) without prolapse of the uterus is more frequent than we formerly believed and that it is frequently overlooked and classed as a rectocele, both conditions being frequently present.

In spite of the work of Ward and Phaneuf (1925, 1943), even today I feel that enterocele is considered a rare condition. Do the text-books deal with it at length? They do not. It is often ignored entirely or dealt with briefly, the main emphasis being on its infrequency, while a search through the literature shows that comparatively little has been written about it.

It would be interesting to know how many cases of this condition have been dealt with in the last year by the surgeons here assembled. Is enterocele a rare condition because we still fail to recognize it? I feel that this may be the answer, and I would make a plea that we, as gynæcologists, become a little more "enterocele-minded" in the same way as we have learned to become "ectopic-minded".

Like George Gray Ward, my interest in this condition began when I dealt with a patient operated on for prolapse by the Manchester technique. The result, so far as the anterior vaginal wall was concerned, was excellent, but a pronounced enterocele was present and protruded at the vulva three months after operation. This called for a second operation. A well-defined sac was dissected out and the condition dealt with in the correct manner, and a cure was effected. Looking back, I cannot help but feel that before dealing with this case I at times attributed recurrence of bulging of the posterior wall to a rectocele when it was due to an enterocele which I had failed to recognize as such. Perhaps it is wrong to use the term "recurrence". The hernia reappears. It cannot be said to recur, for the simple reason that it has never been repaired.

As Ward states, "the differential diagnosis with the finger in the rectum is easily made but not often employed".

One of the most suggestive symptoms to my mind is the persistence of the condition after an attempted repair of a supposed rectocele. Without doubt it is unrecognized more often than not, and I feel that with more exact investigation of all patients who present a mass on the posterior wall that bulges into the vagina, many more cases of enterocele will be recognized.

Treatment.

There can be no routine treatment for this type of hernia, because coexisting malpositions of the pelvic organs vary to a pronounced degree in different cases. However, the well-established principles which govern the cure of all herniæ must be followed in dealing with enterocele. These are: (i) isolation of the sac, (ii) disposal of the sac, (iii) repair of the defect at the point of egress of the hernia from the abdomen.

The means by which these ends can best be accomplished will depend on the condition and position of the pelvic organs. Any operation which neglects any of these three essential steps must fail. When the condition is not recognized and is treated as a rectocele (high or low), none of these principles are observed. Conversely, any procedure which accomplishes these three steps should result in cure.

There are three methods of treatment: (i) by the abdominal route of Marion and Moschowitz; (ii) by the vaginal route of George Gray Ward; (iii) by the combined route (abdominal and vaginal).

The Abdominal Route.

The abdominal route is often reserved for patients with adhesions which might make the vaginal approach difficult. This abdominal operation calls for obliteration of the pouch of Douglas by a series of linen or chromicized purse-string sutures, which are inserted in superimposed layers, starting at the bottom of the pouch and terminating at the level of insertion of the utero-sacral ligaments. The ureters are a danger and must not be included in these sutures.

The value of this technique lies in the fact that the closure of the pouch of Douglas throws the weight of the intestines forward onto the bladder, the symphysis and the posterior surface of the uterus with the patient in the anterior posture, while a deep cul-de-sac allows the weight of the intestines and the pressure to come on the anterior rectal and posterior vaginal wall.

The Vaginal Route.

Gray Ward makes an incision in the mid-line on the posterior vaginal wall in its entire length. Careful

dissection of the posterior vaginal segment displays the bulging cul-de-sac above the rectum, the two being separated by a layer of adipose areolar tissue. The sac is dissected bluntly as far as the level of the utero-sacral ligaments anteriorly and laterally, and as far as the anterior rectal wall posteriorly. The sac is opened and its contents, which may be large or small bowel or omentum, or all three, are pushed into the abdomen. The sac is clamped at its base and resected. The sac is closed by a running or purse-string suture. (A sponge stick in the rectum serves as a useful guide.) The utero-sacral ligaments are united with interrupted sutures as close to the rectum as possible. The denuded space is obliterated and the vagina is closed with a perineorrhaphy.

Ward states that "in view of my experience it is now my custom to obliterate the pouch of Douglas by the vaginal and abdominal route, as part of the technique in all cases of operation for prolapse of the uterus"—or rather, he wrote this in 1922.

The Combined Route.

Masson (1932) disposes of the sac either by the vaginal or by the abdominal route. If the vaginal route is used, his operation is the same as that of Ward; but in the combined operation the sac is inverted and pushed into the abdomen. The repair of the perineum is then carried out, and when the abdomen is opened the inverted sac is sutured to the posterior wall of the uterus, and then the layer of purse-string sutures is introduced to obliterate the pouch of Douglas.

Operative Difficulties.

When enterocele is present as a separate entity or in the presence of rectocele, no special difficulties present themselves with the operation, the step calling for the greatest judgement being the estimation of the amount of mucosa which must be excised from the posterior vaginal wall. If this is removed in excess, the line of suture is under tension and the danger of sloughing is increased.

However, when enterocele is complicated by pronounced prolapse of the anterior vaginal wall, cervix and uterus —and, as has already been mentioned, this is the usual picture presented—difficulties are likely to arise.

If the anterior vaginal wall is dealt with by the Manchester technique with amputation of the *cervix uteri*, the operator is likely to find that when he ties the Fothergill and succeeding sutures the uterus will ascend in the vagina until the newly constituted cervix occupies the vault of the vagina. It will then be found that access to the enterocele is difficult, for the surgeon will be carrying out the main important steps of his hernia operation at the apex of a narrowed vagina.

However, if the enterocele is attacked as the first part of the operation, I have found that once the sutures which unite the utero-sacral ligaments are introduced, especially if they include the posterior uterine wall just above the cervix, they tend to immobilize the uterus to a degree, and it will not ascend into its new position as it should do when the Fothergill and succeeding sutures are tied.

I have found that these difficulties can be reduced to a minimum with the following technique. As in the Manchester operation, a triangular area (with its apex just below the orifice of the urethra) of anterior vaginal mucosa is mapped out, the incision running round the cervix. This mucosal flap is dissected from the underlying structures, and the bladder is separated from the supravaginal part of the cervix with swab pressure. The necessary amount of cervix is then amputated, it and the mucosal flap being removed in one piece. The posterior vaginal mucosa is then incised in the mid-line throughout its whole length. The sac of the enterocele is then dissected free, isolated, clamped and removed. The neck of the sac is closed. The utero-sacral ligaments are united, but the suture which includes the posterior uterine wall is inserted but not tied. The area of posterior vaginal mucosa to be removed is then marked out and this tissue is cut away. The new cervix is then constituted, and the Fothergill and succeeding sutures are introduced. The last of these deals with the tissues just beneath and lateral to the urethra. These sutures are then tied, and as this is done the new cervix ascends to the vault of the vagina. The edges of the anterior mucosa are then united and the work on the anterior wall has been completed, as in the Manchester operation. The suture which had been introduced to unite the utero-sacral ligaments and to pick up the posterior uterine wall can now be tied. Had it not been introduced previously, its insertion at this stage would be found to be difficult. The operator now works down the posterior vaginal wall, uniting the mucosa and bringing the separated *levator ani* muscles together anterior to the rectum. The perineum is then restored and the skin edges are approximated. Sulphanilamide powder is liberally dusted into the vagina, which is firmly packed with gauze, and this is removed thirty-six hours later.

The danger of removing too much mucosa from the posterior vaginal wall should be emphasized again. This is a real danger, for the redundancy is usually pronounced. If the mucosa is thin and smooth and too much is removed, the cut edges cannot be approximated without such severe tension that the united edges may be blanched and the sutures tend to cut through. In all cases of doubt it is wise to follow the old adage and remove too little. This will soon be apparent and more can then be removed, the amount being regulated according to the ease with which the edges can be brought together.

To summarize, I have found that it is wise to work on both anterior and posterior walls *pari passu*, rather than to complete work on one wall and then proceed with the opposite wall.

Reports of Cases.

I regret that I cannot present a lengthy series of cases, for in the past seventeen months I have dealt with only nine cases of enterocele. All the patients were *multiparæ* and were dealt with by the vaginal approach.

The first patient had a Manchester operation performed, followed some four months later by a plastic operation on the posterior wall. Cure of enterocele was achieved fifteen months ago. To date there is no evidence of recurrence.

The second and third patients had each undergone anterior and posterior vaginal plastic procedures, one twelve years earlier, the other six months earlier. Both complained shortly after leaving hospital of swelling at the vulva on straining. In each of these cases an enterocele was dissected out, and to date neither patient shows signs of recurrence.

The fourth patient, aged sixty-two years, is showing signs of recurrence of her enterocele, which I dealt with nine months ago. I feel now that had I reinforced the vaginal operation by an attack from above, the result may have been better.

The fifth and sixth patients (the only ones in the series) had a pronounced enterocele and rectocele, but no descent of the anterior wall of the vagina or cervix. Neither patient has had a recurrence of posterior wall weakness.

The seventh patient suffered from enterocele following vaginal hysterectomy two years ago. This patient was operated on only eight weeks ago.

The eighth and ninth patients suffered from pronounced uterine prolapse as well as enterocele and were dealt with by an anterior vaginal plastic procedure, amputation of the cervix, cure of the enterocele and colpo-perineorrhaphy. To date both have remained well, with no evidence of recurrence.

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INJURY TO THE SEMILUNAR CARTILAGE IN THE KNEE JOINT: A REVIEW OF 140 CASES.

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Damage to the semilunar cartilage in the knee joint is of common occurrence among young men, particularly in the services. Over the period of 1942 to 1945 over 200 meniscectomies were performed at one Royal Australian Air Force base hospital. It has been possible adequately to follow up only 140 of the patients concerned, and a survey of these is presented in this paper. The group, comprising as it does an average cross-section of the younger men in a young service, is perforce a selected age group of otherwise healthy, and usually, muscular subjects in whom the injury, or the trauma which caused it, would have its highest incidence. Although it would necessitate statistics to prove or disprove the contention, the impression is gained that these injuries are in higher frequency in this group than in a comparable number of young men of the same age in civilian life. The activities incidental to service training produce many injuries to the knee and make manifest any slight disability remaining from previous injury. These men were of all musterings and trades, and, in a service of technical specialization, they were, by and large, highly trained technicians or air crew. A very considerable amount of service time and public money has been expended on their technical training, and their value to the service was considerable. They were not as a rule expected to return to extensive marching and violent ground combat, or to combat training, but to their specialized trades, or in the case of air crew, to flying.

Ætiology and General Considerations.

In the great majority of cases the original trauma was of the type seen in civilian practice and was mostly due to twisting injuries of the semiflexed knee during sport. It was considered, as a matter of policy, that men with damage to the semilunar cartilages in the knee were not unfit for a limited service, but that they required a limitation of their activity. Air crew were not permitted to fly, and overseas service for ground staff was not advisable. Certain types of activity would be restricted.

The view was taken that if good results could be expected from meniscectomy, this would be performed, not only for relief of symptoms and the avoidance of later sequelæ, but in addition to restore the individual to "unlimited medical category".

The results indicate that in the great majority of cases symptomatic relief was obtained and the patient was restored to unlimited activity. The indication for operation became the diagnosis of torn cartilage, and once this diagnosis was made meniscectomy was carried out. Robert Jones, in 1906, stated that his indication for operation was recurrence of symptoms, and that he did not operate on those patients presenting with their first derangement, or in those cases in which further symptoms were transient and not associated with joint irritation. Somewhat similar criteria were invoked in the earlier cases in this series. Operation was not performed at the first "attack" of symptoms, that is, locking, joint irritation *et cetera*. The diagnosis was made and the individual was placed in a new category; only the recurrence of symptoms was considered an indication for meniscectomy.

After the first short period, however, because of the results obtained with operation, and because of the undesirability of having numbers of men with limited categories, the indication for operation became the diagnosis of torn cartilage. Moreover, better results were ultimately obtained in those cases in which there was a short history of symptoms than in those in which symptoms had been present for some time.

In the Royal Australian Air Force, few arthrotomies were carried out away from base hospitals, and practically none were performed in the field units. Quite apart from the calibre of the operating surgeon, there were several other reasons for this:

1. Asepsis of sufficient degree could not be presumed in the field, and suppurative arthritis, unknown in base hospitals, did occasionally occur in patients operated on elsewhere.

2. The "off-duty" period of some four to eight weeks made performance of operations of election uneconomic in the field.

3. Only observation of the post-operative course would determine whether or not the subject was still fit for service in the field after operation, and this could not be predicted.

4. The very real importance of the whole post-operative management, with adequate supervision in the rehabilitation period, made after-care of patients in the field far from all that could be desired.

Diagnosis.

The correct diagnosis had been made in every case in this series and no normal cartilages were found at operation. Errors of diagnosis are more commonly associated with failure to diagnose a torn cartilage than with making the diagnosis and later finding a normal cartilage at operation. In this series in many cases diagnosis of torn meniscus had not been made at previous surgical consultations. In the diagnosis the greatest importance is placed on subjective symptoms, and so a very careful chronological history is essential. Only occasionally was any conclusive sign elicited by examination. In many cases there is an associated injury, such as a sprain of the medial lateral ligament or a tear of the peripheral attachment of the meniscus, or traumatic synovitis, or hæmarthrosis. The symptoms and signs of these conditions mask further diagnosis, nor can the painful limb be fully moved to test for evidence of internal derangement. Some weeks later, after the acute symptoms have subsided, "locking" or "giving way" of the knee may appear.

X-ray examination was of only negative assistance. No patient was operated on before X-ray examination was carried out in the three positions, namely, those providing antero-posterior, lateral and intercondylar views. The last-mentioned consists of an antero-posterior view in which the knees are semi-flexed to demonstrate the intercondylar notch in profile. No pneumograms of the knee joint were obtained.

Symptoms.

The most frequent symptom was recurrent "locking" of the knee following a twisting injury. The original injury was usually external rotation of the tibia on the femur with semi-flexion of the knee, associated with some abduction strain. However, in many cases the exact nature of the trauma, apart from a twist, was difficult to elicit. The degree of trauma varied tremendously from the full weight of a football opponent applied to the knee to the simple movement of rising from a chair, or from rising after kneeling to clean the shoes.

The history of "locking" should always be elicited from the patient in his own words. Most patients had heard the word "locking" used, and many used it indiscriminately when this symptom was not really present. Most patients described it as an inability to straighten the leg because of pain, caused by something in the knee acting as a "chock" or wedge. A considerable number described a "clicking" in the joint, which is really a minor degree of locking overcome by further extension of the knee by the patient himself.

All the patients were able to state which side of the knee was affected, a very useful and reliable piece of information. Most of them referred the trouble to the region of the anterior horn, but several just vaguely referred to the medial or lateral aspect of the joint. In the case of the only patient who could not localize which side was affected, operation disclosed that both cartilages were torn.

Many patients did not give a history of "locking" but complained that the knee felt weak and frequently "gave on them", so that they were afraid to run or hurry up or down stairs. This, however, is symptomatic of any internal derangement of the knee joint irrespective of the cause and may be the only symptom of a tear of the posterior horn. In these cases the presence of McMurray's sign was frequently of the greatest value. In a few cases the only symptoms were attacks of recurrent effusion without any history of locking. In these cases the diagnosis was made by excluding the other possible causes of internal derangement of the knee joint. The symptom of "giving way" is found also in cases of lax cruciate or capsular ligaments and is due to reflex inhibition of the quadriceps following slipping of the tibia and femur. In such cases the laxity is detected on examination and a note of its presence is of great prognostic importance. Protective spasm of a muscle is associated with reflex inhibition of its antagonist and sudden "giving way" of the knee is found when capsular adhesions are present. In these cases the patient experiences sudden local pain before the knee gives way. In the other cases the pain follows the injury to the knee caused when the knee slips. Giving way of the knee may also result from an insufficient tone of the quadriceps muscle.

Additional symptoms at the time of the original injury may give an indication of the lesion in the cartilage. Immediate swelling of the knee, that is, hæmarthrosis, is usually due to a peripheral tear because the cartilage is vascular only near its peripheral attachment. An attack of "locking" which was relieved dramatically by manipulation favours a "bucket-handle" tear. "Locking" which could not be relieved by manipulation, and which recovered only after some days, is usually caused by a badly torn anterior horn. Clicking associated with full flexion, during squatting, without definite locking, was the complaint in several cases. In these the patient was found to have a tear of the posterior horn.

Signs.

Some, or all, of the classical signs of internal derangement of the knee joint were found in these cases, for example, quadriceps wasting, effusion into the joint and general laxity of the ligaments. In addition, signs specific of a torn meniscus were frequently encountered. Occasionally the detached anterior horn may be palpated as a loose fragment. More frequently the peripheral fragment may be palpated as a general protrusion along the joint line. This is due to pressure outwards on this fragment by the condyle of the femur. McMurray's sign was frequently elicited. Tenderness over the site of the anterior horn was present in most cases. Lack of full extension was present at the time of examination in many cases, especially when examination was made shortly after an attack of locking.

Differential Diagnosis.

All other causes of internal derangement of the knee joint must be considered before a diagnosis of torn meniscus is made.

Loose bodies in the knee joint frequently cause repeated attacks of "locking", usually momentary and without any definite history of injury. The patient often volunteers the information that the site of "locking" varies from time to time, and occasionally the loose body can be palpated in different positions ("joint mice"). X-ray examination usually, but not always, discloses the presence of a loose body.

Osteochondritis dissecans causes a vague aching or clicking, or attacks of "giving way" of the joint over a long period of time often with no history of injury. Classical "locking" will result after the fragment has become free in the joint. In many cases the loose piece forms a trap-door, being attached by one edge. X-ray examination usually demonstrates the separate fragment, though in the trap-door type involving cartilage alone no abnormality may be seen in the film.

Strained internal lateral ligament of the knee is produced by a similar abduction injury to the knee joint, and there is no doubt that in many cases of torn cartilage there is an accompanying sprain in the internal lateral ligament. Vague clicking may occur, owing to the general laxity of the ligaments and to thickening due to bruising and hæmatoma. Pain produced by passive abduction, together with tenderness situated over the ligament, often not confined to the joint line, is a very definite sign of a strained medial ligament.

Torn cruciate ligament results from a more extensive injury than that causing a torn cartilage. The two injuries may coexist. The knee is obviously seriously damaged, and the excessive increase in antero-posterior movements of the tibia on the femur is an essential sign. It must not be forgotten, however, that any internal derangement of the knee joint, with corresponding wasting of the muscles and prolonged synovitis, results in general laxity of the ligaments. This may result in the presence of abnormal movements, such as abduction, and an increase in the antero-posterior movement of the tibia on the femur. It is only when this movement is excessive that one is justified in the conclusion that a torn anterior cruciate ligament is present. Comparison with the opposite knee is essential; the laxity of the normal knee varies.

"Nipped synovial fringes" were not encountered and are considered by us to be associated only with general osteoarthritis of the joint and to occur in elderly persons.

Osteoarthritis of the knee joint is indicated by the presence of continuous aching, recurrent severe joint irritation and swelling, and is accompanied by typical X-ray findings.

Selection of Cases for Operation.

As explained above, operation was advised in this series when a diagnosis of injury to a meniscus was made, even if the attack was a first one, and it is believed the results justified this decision.

The question then arose as to the contraindications of operation. Should the presence of osteoarthritis or injured cruciate ligaments preclude operation in service cases? The symptoms in such cases are usually relieved by removal of the torn meniscus, the continued presence of which leads to further laxity and joint deterioration, but the patients should be warned that operation will not restore the knee to normal. Our results indicate that though the operation will not result in full fitness, many men were enabled to carry out long periods of useful service. All those discharged later from the service as unfit were of this group.

The Operation and the Operation Technique.

The operation technique depends on accurate diagnosis before operation. The operation described in this article is in no sense an exploratory one, being performed through a small incision. It is designed to allow removal of the affected meniscus and to present a view of the femoral condyle on the affected side. Certain other structures, such as the cruciate ligaments, are seen in part, but they are not widely enough exposed to show whether they have suffered minor injury.

Application of the Tourniquet.

For the purpose of obtaining a bloodless field an Esmarch bandage is used. The limb is elevated for five minutes before application of the bandage, which is applied around the mid-thigh. It is essential that the tourniquet be put on by a person reasonably skilled in its application. The patient and the success of the operation are greatly interfered with by the accident of a "slipped" tourniquet. In our experience it has been found that no harm results from a tourniquet application lasting for thirty minutes, or even a little longer.

Operation Technique.

The incision is made to the outer or inner side of the patella, as occasion demands, and is vertical for a medial meniscectomy and oblique for a lateral.

For medial meniscectomy the incision is kept close to the medial border of the patella. This has been found to minimize the risk of nerve injury. In the present series the incidence of post-operative neuroma formation has been nil.

It is desired to emphasize the fact that, once the decision to operate is made, the surgeon is committed to the removal of the semilunar cartilage.

As previously explained, the operation here described is not an exploratory one; minor tears and posterior tears are often not obvious until the cartilage is free, and if uniformly good results are desired the cartilage must always be removed once the decision to operate is made.

The anterior portion of the meniscus is identified, and with the aid of a diminutive hook applying traction to the meniscus, a preliminary inspection of the meniscus is made. It is detached from its anterior attachment, the cut end is grasped in Kocher's forceps, and a combination of pulling and rocking will enable the surgeon to obtain a more extensive view of the cartilage. The aim of the operator should now be to dislocate the entire cartilage into the centre of the joint. In the grosser types of "bucket-handle" tears this will prove to be easy, as not only is the cartilage loose, but the capsule is generally lax. In the less severe types of injury, it will be found necessary gradually to free the periphery of the cartilage, by alternate pulling with Kocher's forceps and cutting of the attachment of the meniscus to the capsule of the joint. Finally, the whole, or nearly the whole, of the cartilage becomes free, and it is severed as close to the posterior attachment as is possible. If, when one is operating on posterior horn tears, the anterior half of the cartilage appears normal, removal is proceeded with in the fashion described above. In most instances of posterior horn tear, after the anterior half is freed, the posterior portion will slip across to the centre of the joint, and the final removal is thereby made comparatively easy. An inspection of the femoral condyle is then made for evidence of loose body and for osteoarthritis. Occasionally one encounters a partially loose body, which is removed. The demonstration of the presence of osteoarthritis will materially alter the prognosis, as a knee with thinned and degenerated, eroded or cracked articular cartilage cannot be expected to make the complete recovery which one could reasonably expect from a young and healthy joint. Such parts of the cruciate ligaments as can be seen are inspected, and any obviously diseased synovial fringes are removed. It has been found that satisfactory repair

of old tears of the cruciate ligaments is not practicable, and it was therefore never attempted.

Having completed the removal of the affected meniscus and having inspected such areas of the joint as are exposed, the surgeon proceeds to close the joint. This is carried out by the sewing up in separate layers of synovial membrane, capsule and skin. Various individual preferences are used in this procedure. Closure of the wound is facilitated, especially in the case of lateral meniscectomy, if the knee is extended slightly by lifting of the patient's foot with the surgeon's own knee. "No-touch" technique is practised throughout the operation. The skin packs are removed and the skin is sutured with non-absorbable material, interrupted sutures being used in this instance. The pressure bandage is then applied, the tourniquet is released and the patient is taken back to the ward.

The Operation Designed for Removal of the Posterior Horn.

In certain instances it is found impossible to remove the whole of the cartilage at a primary meniscectomy, the posterior portion remaining *in situ*. It is sometimes advocated that, in these circumstances, a separate incision should be made for the removal of the posterior horn. This has not been the practice in this series, it being argued that if a posterior segment is small and firmly fixed it will give little further trouble. This conclusion is borne out by the fact that in this series in only two cases in which a complete meniscectomy had not been carried out, has a patient reported complaining of the posterior horn syndrome. Of these patients, one was operated on through the posterior approach with satisfactory results. The other refused operation. It is also believed that the routine removal of the posterior horn through a second incision is attended by a greater morbidity and prolonged convalescence.

Findings at Operation.

The following types of lesion were found at operation: bucket-handle tear, 68 cases; posterior horn tear, 11 cases; anterior horn tear, 20 cases; loose cartilage, five cases; tear (not specified), 19 cases; cyst, 10 cases; discoid lesion, one case.

The following evidence of joint damage was found: evidence of osteoarthritis, 13 cases; articular cartilage erosion, 11 cases.

Medial meniscectomy was performed in 117 cases and lateral meniscectomy in 23 cases.

Post-Operative Treatment after Meniscectomy.

The successful after-treatment of an arthrotomy of a knee-joint, with removal of a meniscus, is dependent upon many factors; but of these, careful attention to the function of the quadriceps muscle and the close supervision by the surgeon himself of every stage of the post-operative routine are the two most important points in full and rapid recovery.

In order that progress may be continuous, the actual post-operative régime is commenced prior to operation. The patient is admitted to hospital at least three days before operation, so that he becomes proficient in quadriceps exercises. It is found that the patient must be impressed with the value of these exercises from the beginning of treatment. This is most effectively accomplished if the surgeon, at the time of reexamination prior to operation, personally gives the patient a simple explanation, shows him the exercises, and spends sufficient time to ensure that the patient has learnt the simple exercises before sending him to the physiotherapist for further instruction. It is to be emphasized that the physiotherapist plays a very important part in the scheme of post-operative treatment and has, therefore, to be enthusiastic, painstaking and, above all, thoroughly conversant with every detail of the treatment adopted. In this, as in all other branches of surgery, efficient teamwork is the secret of success. It is important that the patient perform all the exercises freely in the recumbent position before operation is carried out.

The type of exercises taught to the patient have as their basis a realization of the fact that the main action of the quadriceps muscle is the prevention of flexion of the knee when the person is in the erect position, rather than the effecting of extension of the knee. This means that it is a postural or "holding" muscle, the reeducation of which is more readily accomplished by "holding" exercises than by phasic work, such as alternate flexion and extension of the knee. Only simple exercises, consisting of "flicking" the patella and bracing the knee into full extension, are used. In order that these exercises may be effective they must be carried out deliberately, to their full extent, with short periods of rest between each contraction. They can be accomplished with no more than minimal movement of the knee and are thus possible with an extended knee firmly controlled by a pressure bandage. The routine instruction to the patient is that he contracts the quadriceps muscle for five seconds, followed by five seconds of relaxation, for five-minute to ten-minute periods, hourly, during his waking periods. In order to acquire the act of voluntary control of the quadriceps he is asked to press the back of the knee firmly into the bed. A further exercise consists in lifting the fully extended leg from the bed. This exercise is carried out at a later stage of the post-operative treatment than the former two exercises.

With all these exercises another important effect is that, even in the extended leg, the minimal movements which they initiate have an important bearing in preventing capsular adhesions, as well as contributing a beneficial effect on joint effusion.

At the completion of operation, and before the tourniquet is released, the surgeon personally applies the pressure bandage, upon which much reliance is placed in the limitation of post-operative complications. The bandage is applied with careful attention to many details. The sterile dressing applied to the site of the incision is covered with a uniform layer of sterile wool, made in the form of a bandage four to five inches wide and about half the normal thickness of a cotton wool roll, and extending well above and below the knee. This is now covered by a sterile *crêpe* bandage, which is applied very firmly, but not too tightly, over the area covered by cotton wool. Experience is necessary to provide the right degree of tension in order to avoid gross vascular obstruction on one hand and looseness on the other. Minor precautions during the applications are worthy of attention, to ensure an even bandage, to prevent discomfort over the hamstrings and to avoid the application of the bandage to uncovered skin. A second layer of similarly applied wool and bandage is superimposed upon the first. The correct application of this pressure dressing is most important; it normally remains untouched for at least three days after operation, it is immediately reapplied when changed, and its removal is entirely under the surgeon's orders.

The patient, on return to the ward from the theatre, is placed in bed with the leg extended; no splint or retention appliance, except the pressure bandage, is used. The leg is kept extended, and the tendency of the nursing staff to place the knee in flexion, resting upon a pillow, should be anticipated. The circulation in the limb is watched, and any slight cyanosis or œdema from pressure of the bandage is controlled, almost invariably, by elevation of the foot. Sedatives may be necessary, morphine sulphate in appropriate doses being given in the first few days. An important point that has been stressed is the commencement of the gentle quadriceps exercises as soon as the patient is able after recovering from the general anæsthetic. These are in the form of "flicking" of the patella and gentle attempts to brace the knee in extension. At this stage, encouragement from the surgeon or physiotherapist achieves good results, and pain, surprisingly, is minimal. After medial meniscectomy exercises are continued for forty-eight hours before attempts are made to lift the heel of the extended leg from the bed. At the end of seventy-two hours the pressure bandage is removed and immediately reapplied with a little less tension; the sterile dressing over the wound is normally not disturbed. If there is no gross effusion into the joint, if the quadriceps tone is good, and, provided the lifting of the leg off the bed has been performed satisfactorily and the pressure bandage has been properly reapplied, it is considered safe in uncomplicated cases for the patient to commence weight-bearing at the end of five days. It has been the practice for the surgeon to supervise this step. After explaining to the patient that he will experience no pain, and that his knee will be stable, the surgeon impresses upon him the necessity of a "heel and toe" gait and the fact that he must keep his knee fully "braced" by quadriceps action. A few steps only are permitted. The patients almost invariably express amazement at the little discomfort experienced and at the "soundness" of the knee. This confidence which they attain goes a long way towards rapid recovery. The walking is repeated on subsequent days, stress being laid on frequent short walks in preference to a long one; the patient is asked to report any untoward symptoms and is observed to ensure that no ill-effects develop.

The pressure bandage is maintained until the sutures are removed, on or about the tenth day. It is then modified, or replaced by a *crêpe* bandage, according to the state of the knee, and is ultimately discarded in about fourteen to seventeen days.

Flexion of the knee commences at the end of ten to fourteen days after operation, provided that there is no effusion and no

no gross quadriceps wasting is present. At first the flexion is slight, is carried out by the patient in the recumbent position, and is gradually followed by climbing of stairs, running *et cetera*. The progress in each case is governed by any complaint of pain, instability of the knee, loss of quadriceps tone or the development of an effusion.

It is recognized that the post-operative course of lateral meniscectomy is more troublesome than that of the medial type, and slower progress is made.

A large number of patients after meniscectomy have almost full flexion of the knee, no effusion into the joint and full quadriceps power, and are able to run on good surfaces in about four or five weeks.

It is noted that great stress is placed upon quadriceps exercises and that quadriceps wasting has been very little in most cases.

The proper application and retention of the pressure bandage limit the formation of hæmarthrosis and the development of post-operative effusion into the joint. Those two conditions are probably the most common complications which occur after operation, and so their prophylaxis is important. Application of the bandage before release of the tourniquet at operation, with maintenance of the pressure for seventy-two hours continuously, prevents the formation of hæmarthrosis. If, from some inattention to these details, hæmarthrosis occurs, it is manifest by local pain, considerable febrile reaction, and a tense effusion into the joint, which has a "doughy" consistence on palpation. It responds to conservative treatment by non-weight-bearing quadriceps action and the application of a pressure bandage. The progress in such a case is slower than that after uncomplicated meniscectomy, and more physiotherapy is required in the latter stages to obtain full joint movement.

A synovial effusion of some degree or other accompanies any operative trauma to a knee joint, but this is usually minimal if the correct procedure is adopted in the application of pressure at the end of the operation. Its subsequent appearance is due to looseness of the bandage, to its early release or improper reapplication, or, later in the convalescence, to too rapid progress with the exercises or too vigorous exercises. The later types of effusion usually respond rapidly to a pressure bandage, quadriceps exercises, and partial or complete cessation of walking for one or two days, followed by gradual return to full activity.

Minor disabilities, such as venous obstruction with slight œdema of the leg, are occasionally noticed when the bandage is too firm. These are often relieved by elevation of the leg, provided no arterial obstruction renders more active treatment necessary. Only rarely does the pressure dressing need readjustment.

Small hæmatoma formation is occasionally encountered, with some delay in healing or perhaps low-grade infection, but this is prevented by proper skin preparation, by proper suturing of the deeper layers of the wound and skin and, above all, by the pressure bandage.

Wound infection, with infection of the joint, is a complication to be feared and results from a failure of aseptic operative technique in many cases. Fortunately its occurrence is extremely rare.

The existence of osteoarthritic changes of the articular surface of the femur, or less frequently of the tibia, has led to a much slower convalescence, a longer stay in bed, slower progress in the exercises, and more difficulty in the controlling of the effusion, which is also liable to recur with any increase in the activity of the joint. The prognosis is less favourable when osteoarthritis complicates a meniscus injury, as full range of movement is slower in accomplishment or else is not fully recovered.

Periarticular or capsular adhesions sometimes increase the convalescent period, as they make flexion of the knee difficult, and are sometimes associated with recurring mild joint effusions. They result from improper control of joint effusion, or from some low-grade infection or induration in the wound. Active physiotherapy almost invariably completes the cure, but sometimes after progress has been stationary for some time, manipulation of the knee, under general anæsthesia, is necessary to restore a full range of movement of the knee joint.

The rehabilitation of the patient after a meniscus operation depends on the personal supervision of the surgeon through the whole régime, a conscientious physiotherapist well trained in the routine post-operative treatment, and a proper mental attitude on the part of the patient. This last is achieved by the patient's desire to get well, his confidence in the surgical team, and a proper understanding of all procedure adopted. Continuity of treatment is essential for good results, and it is again emphasized that the importance of controlled quadriceps activity and the necessity of correct application and supervision of the pressure bandage must be stressed in any post-operative routine.

Post-Operative Complications.

The following post-operative complications were encountered: femoral thrombosis, one case; hæmarthrosis, two cases; subcuticular hæmatoma, six cases.

Analysis of Results.

Rehabilitation.

After operation one of two courses was adopted in regard to rehabilitation and return to duty.

Before the establishment of a rehabilitation unit, it was our practice to retain the patient in hospital till he was fit for a short period of leave. After this he returned to duty, but a limitation, such as the avoidance of excessive marching for four to six weeks, was placed on his activities for a short period. This is easily possible in the air force, as most of its members are air crew or tradesmen and, in comparison with army personnel, do very little marching and are subjected to less strenuous use of the knee.

After the establishment of a rehabilitation unit, we were able to discharge the patient from hospital earlier, and he was not returned to duty till judged completely physically fit. The average periods of incapacity from entry till return to duty were as follows: 29 patients treated in hospital only, 34 days; 51 patients treated in hospital for 25 days with leave for nine days, 34 days; 60 patients treated in hospital for 18 days and in the rehabilitation unit for 45 days, 60 days. For 140 patients the general average was 47 days. The average incapacity after medial and lateral meniscectomies was the same.

Unsatisfactory Results.

Before any elective major operative procedure is advised on a service member, it should be reasonably certain that the operation will result in a return of the patient to duty. If this cannot be expected it may be advisable to discharge the member from the service as medically unfit.

This series of cases demonstrates that meniscectomy is justified, for in all cases the men were returned to duty, although subsequently seven were invalided from the service. In some cases, such as those in which osteoarthritis was present, the medical category was not first class before operation and it was not as a rule improved by operation, but in all cases the men were enabled to perform a long period of further useful duty at the time when the manpower problem was acute.

Of the patients in the series, 18 (or 12%) have subsequently complained of unsatisfactory function of the knee. The symptoms complained of were as follows: "giving way", seven cases; "locking", two cases; aching, eight cases; "short leg", one case.

The findings on examination were as follows: lax cruciate ligaments, four cases; grating, four cases; loose posterior horn, two cases; limitation of flexion, two cases; no abnormality, six cases.

Diagnosis was made as follows: capsular adhesions, one case; loose posterior horn remnant, two cases; lax cruciate ligaments, four cases; osteoarthritis, four cases; no disability, seven cases.

The disposal of the men was as follows: permanently unfit, seven cases; reduction in category, four cases; full duty, seven cases.

It is evident that the presence of injury to the cruciate ligaments or of osteoarthritis is not necessarily a contraindication to the removal of a torn meniscus. In such cases there is usually improvement, but the result is less satisfactory, recovery from the operation is slower, and a normal knee is not obtained. In this series none was made worse.

Although in 15 cases signs of osteoarthritis and of erosion of the articular cartilage at the site of a previous contusion were noted, only nine of the patients concerned reported later, and of these six (4%) were discharged as medically unfit and three were reduced in physical category. The symptoms in these cases were aching after activity, recurrent swelling, grating on movement or even momentary locking.

Seven men complained that "giving way" of the knee persisted after operation and in five cases the symptom was due to laxity

resulting from rupture or stretching of the cruciate ligaments at the original injury. In these cases the condition had been improved by operation. One man was discharged as medically unfit after completing two years' service after operation.

In two cases (1·5%), the diagnosis was made of loose posterior horn remnant, causing symptoms subsequent to operation, and the remnant was removed in one case with cure of the symptoms.

Malingering by prolongation, exaggeration or resurrection of symptoms is not unknown, and such subjective symptoms as aching and locking without physical signs are often used, physical signs being absent. In seven cases among the men who complained, no abnormality could be detected, and in five cases there was definite parallel evidence that the airman was malingering.

Acknowledgement.

We wish to thank Air Commodore E. A. Daley, K.H.P., Director-General of Medical Services, Royal Australian Air Force, for permission to publish this paper.

INFLUENZAL MENINGITIS.

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IT is proposed to discuss the fifteen cases of influenzal meningitis which have occurred at the Royal Hobart Hospital during the past two years. All patients have recovered, and only one patient has sustained serious complications. Individual case histories will not be presented, but rather the clinical impressions in respect to all, and in particular details of the treatment routine employed.

The average age of the patients was fourteen months; the youngest was aged three weeks, the oldest four and a half years.

Mode of Onset.

It is nearly always possible to diagnose the condition clinically. The parents may volunteer only the information that the child has been ailing for one to two days, but closer questioning generally elicits information that mild symptoms have been present for seven to ten days, with an insidious progression to the present state. Vague listlessness, anorexia, "U.R.T.I.", cough and "bronchitis", failing to terminate with or without treatment, but rather becoming worse, commonly herald this dangerous illness.

Two children of this series developed meningitis after their admission to hospital with the diagnosis of pyrexia of unknown origin. Meningitis was considered initially in these two cases because lumbar puncture was performed, yet the cerebro-spinal fluid was microscopically clear in both cases. The symptoms progressed, and a repeat lumbar puncture within thirty-six hours disclosed turbid fluid containing influenzal bacilli.

In brief, influenzal meningitis is uncommonly of acute onset; it is a common disease and must be constantly suspected in any vague pyrexial illness in the young child. An appeal may be made for the more frequent performance of lumbar puncture in such indeterminate illnesses; even if the fluid appears clear on macroscopic examination, a few pus cells and influenzal bacilli may be found on microscopic examination. One negative cerebro-spinal fluid finding does not preclude the development of this illness in the next few days. Upon the slightest suspicion of developing meningitis, lumbar puncture must be repeated immediately. The typical picture of the other purulent meningitides—namely, pronounced neck stiffness, the presence of Kernig's sign, drowsiness and irritability proceeding to coma—must, in the case of influenzal meningitis, be regarded as indicating a well-established disease process that will be difficult to cure.

Diagnosis or Pathological Consideration.

It is our practice to have penicillin and streptomycin drawn up into a syringe when we are about to perform lumbar puncture in any case of suspected meningitis. If turbid fluid is obtained, about 10 millilitres are collected into a sterile test tube, and the antibiotics are immediately injected intrathecally through the same needle. This means that we have but one sample of fluid upon which to make a bacteriological diagnosis, as after such a procedure repeated lumbar puncture almost always produces sterile fluid. However, we feel that we are justified in this practice, as therapy is commenced at the earliest possible moment, and the child is saved an extra lumbar puncture if the organism is found to be the influenza bacillus.

All cerebro-spinal fluid in this series has been examined within a few minutes of collection. In the majority of cases the cerebro-spinal fluid is not so turbid as in the other suppurative meningitides, but this is not invariable. In the majority of our cases, organisms have been found in the stained smear. We believe this is largely attributable to the fact that most patients have had no chemotherapy prior to their admission to hospital. There was great variation in the number of organisms present in a smear. In some cases fields were crowded with Gram-negative cocco-bacilli, but this was the exception; mostly the organisms were scattered, and search had to be made for them. In two cases no organisms were seen on smears; but because of the mode of onset these patients were treated as for influenzal meningitis and within twenty-four hours cultures were obtained.

Repeat examinations of the cerebro-spinal fluid were made every day for a few days and then every second day. In no case did the fluid become secondarily infected by another organism, and in all cases attempted culture of microorganisms from the fluid was unsuccessful after the first occasion.

Principles of Treatment.

One reads of many series of cases of influenzal meningitis discussed in the literature. Different writers have employed varying combinations of our four therapeutic weapons, with very variable but not always very satisfactory results—sulphadiazine and penicillin alone, sulphadiazine and streptomycin alone, streptomycin and anti-hæmophilus rabbit serum *et cetera*. With the recent availability of streptomycin and rabbit serum, we see no contraindication to the use of all four weapons, and these in adequate dosage and for an adequate period. As influenzal meningitis carries a substantial mortality rate, we must be prepared to force treatment and risk the lesser hazards of the various toxic reactions. We sincerely believe that the employment of treatment as detailed below, with special stress on the duration of treatment, has prevented any deaths and has limited serious complications.

Treatment Details.

Sulphadiazine.

Infants and children can doubtless tolerate much higher dosage of sulphadiazine, estimated by body weight, than can the adult.

No complications were experienced from the use of this drug. The dosage varied between two tablets every four hours for the oldest child and one tablet every six hours for the three weeks old baby. Treatment was continued at the same level for between nine and twenty-nine days, the average duration being fifteen and a half days. Intravenous therapy with equivalent dosage was necessary in four cases. Intramuscular administration of any sulpha preparation we believe to be contraindicated in the treatment of children, owing to the danger of abscess formation. This method was used in one case and two abscesses developed, with consequent prolongation of convalescence.

Anti-Hæmophilus Rabbit Serum.

Sixty millilitres of anti-hæmophilus rabbit serum were given intramuscularly *statim* in divided doses, and a further 60 millilitres were administered, also intramuscu-

larly, during the next twenty-four hours. Some clinicians have recommended smaller dosage in the less serious cases. However, in apparently mild cases disappointing relapses may occur. Anæmia requiring blood transfusion developed in nine of our cases; three patients required two transfusions. Apart from this simply managed complication, rabbit serum appeared without ill effects, so it is intended to persist with this uniform dosage in future cases.

Penicillin Given Intramuscularly.

In this series the dosage of penicillin administered intramuscularly has been 50,000 units every three hours in all cases. The average duration of administration has been sixteen days. Some authorities argue that the organism is insensitive to penicillin and that little if any penicillin passes the meningeal barrier (whether inflammation is present or not). We argue that the sensitivity of the hæmophilus organism to penicillin varies considerably, and that there is sufficient evidence to indicate that the drug can pass the meningeal barrier. No toxic reactions to intramuscular administration were experienced in this series; so when any doubt exists as to its efficacy, we feel obliged to continue its use.

The young child undergoing frequent lumbar punctures occasionally sustains a mildly infected back. Penicillin given intramuscularly undoubtedly lessens this hazard.

Streptomycin Given Intramuscularly.

The dosage of streptomycin administered intramuscularly varied between 0·3 gramme and one gramme per day, usually in four divided doses; it was given for a period of nine days as a minimum and for an average of fourteen days. Vertigo and staggering gait were observed in one child, persisting for six weeks after discharge from hospital, but clearing completely. No other toxic effects were observed.

Penicillin and Streptomycin Given Intrathecally.

When penicillin and streptomycin were given intrathecally, the dosage of each was as follows: streptomycin, 25 to 50 milligrammes per dose; penicillin, 10,000 to 20,000 units per dose. They were administered together twice a day for three days, then once a day for an average of another nine days.

Cerebro-spinal fluid pleocytosis and fever due to irritation by these agents proved a difficult problem. We do not believe, as some authorities advocate, that the intrathecal administration of penicillin and streptomycin should be discontinued four or five days after the cerebro-spinal fluid is sterile. However, what may appear to be a serious relapse of the infective process with pyrexia *et cetera* may be a purely irritative phenomenon. We used as one of our criteria for the discontinuance of intrathecal therapy, the nature of the cerebro-spinal fluid pleocytosis. A sustained lymphocytic response was considered usually to be due to irritation by antibiotics, and this helped us to decide when to leave off intrathecal therapy. In at least one case, however, a predominantly polymorphonuclear pleocytosis was attributable to intrathecal drug therapy.

When in doubt we continue intrathecal therapy, as no permanent harm of such "overtreating" appears to ensue; but clinical judgement is required, and each case must be assessed on its merits. Occasionally intrathecal therapy may be discontinued as a trial for two days whilst all other therapy is continued. If a rapid drop in temperature and clearing of the cerebro-spinal fluid occur, the problem is elucidated.

If one encounters a "dry tap", cisternal or ventricular puncture must be resorted to. Such measures were required in four of our cases; no attempt was made to perform through-and-through washes. Frequently one can obtain only one or two millilitres of fluid under very low pressure at lumbar puncture. It is believed that this must be due to leakage of cerebro-spinal fluid through the numerous puncture holes in the dura; hence one must be confident the fluid is being obtained from within the dura rather than from the pool outside the dura before injecting the antibiotics.

Adhesive tape and collodion should never be used to dress the puncture site, nor should the skin be overzealously scrubbed prior to lumbar puncture. Such measures lead to rapid excoriation and infection of the back.

General Nursing Measures.

Most babies can continue to suckle without difficulty, extra fluids being given as a supplement.

Moderate sedation is essential. Urinary retention must be watched for.

Complications.

The only serious complication occurred in the patient aged three weeks. This baby was slow to respond and relapsed frequently, "dry taps" developed and numerous ventricular punctures were required; she is now left with severe residual cerebral damage. Two other patients showed temporary mild paresis; both have now almost completely recovered, and the mentality seems unimpaired.

Conclusion.

We have been gratified with these results in what admittedly is a small series of cases of influenzal meningitis. However, prior to the treatment of this series, when streptomycin was unavailable and rabbit serum had not been used extensively, the results of treatment of influenzal meningitis at this hospital had been rather disastrous.

Acknowledgement.

We wish to express our great indebtedness to Dr. John Millar, honorary pædiatrician at the Royal Hobart Hospital, for his guidance and encouragement in the treatment of these, his patients.

Reviews.

BONE MARROW BIOPSY.

A MONOGRAPH on "Bone Marrow Biopsy" by S. J. Leitner, of the University of Berne, Switzerland, has been translated into English by C. J. C. Britton and E. Neumark.[1] In their preface the translators observe that the need for a reference work on sternal marrow biopsy findings has been felt by all hæmatologists, clinicians and pathologists. Britton was in fact working on such a book when he was asked to review the Swiss edition of Leitner's book. He found that "this book covered the ground very well indeed and particularly with regard to the Continental literature; so it was considered that a translation, with the addition of later references and the inclusion of those English and American papers which had not been included owing to war difficulties, would be the most satisfactory course to follow".

Leitner gave the translators wide discretion in the incorporation of new material, and made his additions and alterations for the second Swiss edition available to them. In the author's preface, Leitner states that his monograph is based on investigations carried out at the medical clinic of the University of Berne and that it is intended mainly for practical clinical use. In it the results of marrow biopsies are recorded, based on an experience of more than 2700 sternal punctures in the case of more than 920 patients.

It is illustrated by seven plates (six in colour) and many excellent photomicrographs in black and white; those in the chapters on the morphology of the blood cells and on studies of mitoses are of particular interest. There are no illustrations of histological preparations, though the author states that it has been his practice to examine sections of the marrow in all doubtful cases. For completeness, such illustrations should have been included; when the examination of marrow is necessary for diagnosis sections are often required to check and supplement cell counts made from smears.

The book is extraordinarily well documented; lists of references, some very long, appear at the end of each chapter. Introductory chapters on the technique of marrow puncture and the morphology of marrow cells are very good. The subject matter of the remainder of the book is

[1] "Bone Marrow Biopsy: Hæmatology in the Light of Sternal Puncture", by S. J. Leitner, M.D., English translation revised and edited by C. J. C. Britton, M.D., Ch.B., D.P.H., and E. Neumark, M.B., B.S. (London), M.R.C.S., L.R.C.P.; 1949. London: J. and A. Churchill, Limited. 9½" × 6¾", pp. 540, with 194 illustrations, some of them coloured. Price: 42s.

systematically presented, as in a text-book of hæmatology, and bears witness to the remarkable industry of the author rather than to his discrimination. It is the work of an enthusiastic and assiduous collector rather than of a critical investigator. Sternal puncture is justifiable only when it is necessary for diagnosis. The author and many other industrious persons have performed sternal punctures not only in blood dyscrasias and in diseases of the reticulo-endothelial system, but in most of the known infectious diseases—mumps, rubella, measles, smallpox, tuberculosis and others—in disorders of metabolism such as *diabetes mellitus*, in endocrine diseases, and even at each month of normal pregnancy. To record such findings without comment is to invite criticism. One is reminded of Toynbee's description of certain monographs as "the Industrial system 'in book form' with its Division of Labour and its sustained maximum output of articles manufactured from raw materials mechanically".

There is much useful and interesting information in this book. It lacks the balance necessary to a text-book, but it should prove useful as a book of reference to hæmatologists and research workers and will be essential to writers of papers or text-books on hæmatology.

A YEAR BOOK OF PATHOLOGY AND CLINICAL PATHOLOGY.

APPROXIMATELY equal space is allotted to respective sections on pathology and clinical pathology in "The 1948 Year Book of Pathology and Clinical Pathology", but there is of necessity a certain amount of overlapping.[1] Much of the material in both sections is specialized, but there is a good deal of general interest, and the practitioner who recognizes the importance of maintaining a sound pathological background to his clinical work will find most of the volume acceptable. The section on pathology opens with chapters on general pathology and the pathology of tumours and is then subdivided on the basis of the anatomico-physiological systems. A particularly interesting, and useful, feature of this section is a series of brief special articles by invited authors on subjects of current importance; these are the pathogenesis of shock, the evaluation of exfoliative cytology from the viewpoint of the pathologist, the interrelation of vitamin B_{12}, "animal protein factor", "extrinsic factor" and pteroylglutamic acid in macrocytic anæmia, pulmonary beryllosis, and iron metabolism including the regulation of iron absorption. The section on clinical pathology has chapters on hæmatology, clinical chemistry, "urinalysis", serology, bacteriology, mycology, parasitology, cytology and apparatus. The editor remarks in his introduction that the specialist in any one of these fields will not feel that the year's literature has been adequately covered. The general reader should, however, find much useful material on the year's advances in this important and developing field.

CLINICAL CASE-TAKING.

THE fourth edition of "Clinical Case-Taking" by George R. Herrmann, who is Professor of Medicine at the University of Texas, has appeared recently,[2] and while this book differs but little from similar publications, yet it possesses many features which make it most useful and readable. Thus the introduction which is entitled "The Philosophy of Clinical Medicine" sets out admirably the plan and scope and the principles and objectives of case-taking, and does it in such a way as to make the student realize the great importance that is attached to this phase of clinical medicine.

Besides chapters dealing with each of the systems of the body, a lengthy chapter of some thirty-three pages is devoted to mental and nervous diseases, and there are smaller chapters upon obstetrics and pædiatrics. A novel feature of the book is an appendix which deals with such topics as the study of the unconscious or comatose patient, and the differential diagnosis of some common symptoms such as headache, fever, cough and vertigo, and which finally presents brief descriptions of the various syndromes associated with vitamin deficiencies.

No mention is made of the various laboratory procedures such as blood counting or examination of urine, and whilst it is perhaps debatable whether these should be contained in this type of book, yet if they were, the book would be far more useful to students. The only criticism of the subject matter is the fact that although the student is exhorted to estimate such signs as Krönig's isthmus, and to listen for Skoda's resonance, yet no description of these and other phenomena is found. It is to be hoped that the next edition will remedy this defect and so save the student from having to look elsewhere for explanations when studying this work.

A YEAR BOOK OF ENDOCRINOLOGY, METABOLISM AND NUTRITION.

ENDOCRINOLOGY, metabolism and, to some extent, nutrition tend to be regarded as primarily academic subjects, but the approach to them in "The 1948 Year Book of Endocrinology, Metabolism and Nutrition" is essentially practical.[1] The editor of the section on endocrinology, Willard O. Thompson, in his introduction states that, as in the earlier two volumes of this particular Year Book, articles have been selected for abstracting that appear to have some application to the knowledge and treatment of disease. The material presented bears out this claim; while not all of it has a direct clinical application, any clinician concerned with related fields will benefit by being acquainted with it. The section on endocrinology deals separately with the principal endocrine glands, a few odd matters being collected into a miscellaneous section at the end. The most prominent feature in the subsection on the pituitary is the recent work showing the importance of the adrenocorticotrophic hormone. In the subsection on the thyreoid most attention is paid to the role of radioactive iodine in the diagnosis and treatment of thyreoid conditions, more particularly, toxic goitre and carcinoma. The recent development of knowledge of the adrenals is striking, and the large amount of investigation of the ovaries being carried out appears from the relatively much expanded corresponding subsection.

In the section on metabolism and nutrition, Tom D. Spies, the editor, has collected much interesting material. It is arranged in subsections on the pancreas and liver, the alimentary tract, the hæmatopoietic system, the cardiovascular system, the brain and nervous system, the genito-urinary system, the dermal, muscular and skeletal systems, malnutrition and undernutrition, and therapy. However, there is of necessity much overlapping; for example, such an important development as vitamin B_{12} crops up under many headings. The subject of nutrition is handled in a balanced fashion, and indeed it is striking to note just how far this important subject has advanced since the days when it was left as a happy hunting ground to the quacks and cranks. Particular attention might be called to the wide selection of papers grouped in the subsection on therapy; it should be of interest and value to any medical practitioner, no matter what his particular field may be.

CORONARY ARTERY DISEASE.

IN their well-illustrated and documented publication "Coronary Artery Disease",[2] E. P. and N. F. Boas have presented a clear and concise description of the problems in the clinical appreciation of this important subject. The anatomy, embryology and physiology of the coronary circulation are briefly but adequately introduced prior to consideration of the pathological changes occurring in the coronary vessels and myocardium. The use of the term atherosclerosis as synonymous with arteriosclerosis is certainly apt to cause some confusion, particularly in the minds of those who are taught to look upon arteriosclerosis as a distinct type of arterial disease with hypertension, but

[1] "The 1948 Year Book of Pathology and Clinical Pathology"; Pathology—edited by Howard T. Karsner, M.D.; Assistant Editor, Herbert Z. Lund, M.D.; Clinical Pathology—edited by Arthur Hawley Sandford, M.D.; 1949. Chicago: The Year Book Publishers, Incorporated. 7" × 4½", pp. 544, with 127 illustrations. Price: $4.50.

[2] "Clinical Case-Taking: Guides for the Study of Patients: History-Taking and Physical Examination or Semiology of Diseases in the Various Systems", by George R. Herrmann, M.D., Ph.D.; Fourth Edition; 1949. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 8⅛" × 5½", pp. 250, with illustrations. Price: 26s. 6d.

[1] "The 1948 Year Book of Endocrinology, Metabolism and Nutrition"; Endocrinology, edited by Willard O. Thompson, M.D.; Metabolism and Nutrition, edited by Tom D. Spies, M.D.; 1949. Chicago: The Year Book Publishers, Incorporated. 7" × 4½", pp. 546. Price: $4.50.

[2] "Coronary Artery Disease", by Ernst P. Boas, M.D., and Norman F. Boas, M.D.; 1949. Chicago: The Year Book Publishers, Incorporated. 8" × 5½", pp. 404, with 88 illustrations, one coloured. Price: $6.00.

the text and illustrations leave no doubt regarding the progressive arterial changes and the mode of production of cardiac ischæmia.

The diagrammatic presentation of afferent nervous pathways from the heart indicates, and the text states, that there are direct afferent thoracic cardiac nerves to the upper four thoracic sympathetic ganglia, whereas the considered opinion of many surgeons and the statements in some text-books of anatomy do not support this. This matter is of great importance in the surgical treatment of incapacitating anginal pain, and as ablation of the stellate ganglion is as a rule completely effective in giving relief, the majority of afferent impulses must reach their destination by way of the inferior cervical and first thoracic ganglia. The section dealing with surgical relief of anginal pain and with attempts to provide collateral circulation by operative means could, with advantage, be much more critical.

The mechanism of cardiac pain, the action of drugs on the coronary arteries and the various types of precordial pain are critically discussed, and *"angina pectoris"*, "coronary insufficiency" and "coronary artery occlusion" are dealt with as three progressive stages in atherosclerosis of the coronary arteries. Diagnosis, prognosis and treatment are discussed in detail and practical considerations in the rehabilitation of patients are stressed. An excellent chapter deals with industrial and compensation problems in sufferers from disease of the coronary arteries. A large number of illustrative electrocardiograms is distributed throughout the volume.

The work can be recommended as a handy volume to all interested in disease of the coronary arteries and should be especially useful to general practitioners. A large number of references is given, as footnotes, throughout and provides opportunities for further reading to those interested in extending their knowledge.

HISTOCHEMISTRY AND CYTOCHEMISTRY.

The study *in situ* of chemical constituents of living cells, and of chemical processes operating in cells or small portions of tissue, has been an important branch of biochemistry for several decades. In recent years much progress has been made in this direction, owing principally to the introduction of ingenious new sensitive techniques. A very timely review of these modern methods is now presented by Glick in his book "Techniques of Histo- and Cytochemistry".[1] This work is essentially a laboratory manual for the biochemist whose researches enter the field of ultra-microchemical investigation, but will be read with interest by all who want to know something of how knowledge of the chemical processes of cells is gained. The pathologist and histologist will find much useful material in the early chapters, in which staining methods for specific tissue constituents are discussed.

Adequate detail is given to enable the reader to carry out many of the procedures described; where this is not possible owing to the intricacy of the apparatus or of its use, the text provides an excellent summary of the principles, and an extensive bibliography provides the references to the original work. Glick has succeeded in presenting a concise and accurate treatment of practically every cytochemical technique in contemporary use; there are few omissions, the most important being a discussion of the role and method of use of the micromanipulator. Discussion of alternative methods is objective, sufficient information being given as a rule to enable the reader to assess the probable usefulness of a particular technique for his own purposes.

While it may be argued that a laboratory manual should be no more than a compilation of methods, we believe that the book would have been improved by an introductory general discussion of the whole field of histochemistry and cytochemistry, in which some indication could have been given of the scope and limitations of the various methods, together with a guide to the methods best applicable to particular types of problem. This is especially important for the newcomer to this type of work, and to the research or advanced university student, besides making the book more readable.

There are a few typographical errors, but the format and printing are excellent. The book may be confidently recommended as an essential to the library of all research, and many routine biochemical laboratories.

[1] "Techniques of Histo- and Cytochemistry: A Manual of Morphological and Quantitative Micromethods for Inorganic, Organic and Enzyme Constituents in Biological Materials", by David Glick, Ph.D., with a foreword by Robert R. Bensley, M.D., D.Sc.; 1949. New York: Interscience Publishers, Incorporated. London: Interscience Publishers, Limited. 9" × 6", pp. 564, with 159 illustrations. Price: $8.00.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Text-Book of Surgery", by Patrick Kiely, B.Sc., M.D., M.Ch. (N.U.I.), F.R.C.S. (England); 1949. London: H. K. Lewis and Company, Limited. 9¾" × 6", pp. 1198, with 611 illustrations. Price: 45s.

The author, who is professor of surgery at University College, Cork, has put his lectures into book form.

"Morgagni's Syndrome: Hyperostosis Frontalis Interna, Virilismus, Obesitas", by Folke Henschen, M.D.; 1949. Edinburgh and London: Oliver and Boyd. 9¾" × 6", pp. 190, with many illustrations. Price: 30s.

Gives an account of the author's studies and a review of the literature.

"The Clinical Application of Psychological Tests: Diagnostic Summaries and Case Studies", by Roy Schafer, M.A.; foreword by David Rapaport, Ph.D.; 1949. New York: International Universities Press, Incorporated. London: George Allen and Unwin, Limited. 9" × 6", pp. 346. Price: 30s.

Illustrates "a method of applying a battery of clinical psychological tests".

"Diseases of the Nervous System: Described for Practitioners and Students", by F. M. R. Walshe, M.D., D.Sc., F.R.S.; Sixth Edition; 1949. Edinburgh: E. and S. Livingstone, Limited. 9⅛" × 6", pp. 380, with 60 illustrations. Price: 17s. 6d.

The author has tried "to deal only with what is possible in general practice in the matter of diagnostic methods and of treatment".

"Acute Injuries of the Head: Their Diagnosis, Treatment Complications and Sequels", by G. F. Rowbotham, B.Sc. (Manchester), F.R.C.S. (England), with a foreword by Professor Norman M. Dott, C.B.E., M.D., Ch.B. (Edinburgh), F.R.C.S. (Edinburgh); Third Edition; 1949. Edinburgh: E. and S. Livingstone, Limited. 9¾" × 6½", pp. 504, with 259 illustrations. Price: 35s.

Written for those "who are responsible for the treatment of acute cerebral trauma and who have not received a special training in neurosurgery or in neurology".

"Sanitary Science Notes: A Handbook for Students", by H. Hill, F.R.San.I., F.S.I.A., A.M.I.S.E., and E. Dodsworth, M.R.San.I., M.S.I.A.; Second Edition; 1949. London: H. K. Lewis and Company, Limited. 6½" × 4¼", pp. 146. Price: 7s. 6d.

A revision of the first edition published in 1945.

"Bedside Diagnosis", by Charles Mackay Seward, M.D., F.R.C.P. (Edinburgh), with a foreword by Sir Henry Cohen, M.D., F.R.C.P.; 1949. Edinburgh: E. and S. Livingstone, Limited. 7¼" × 4½", pp. 388, with a few illustrations. Price: 17s. 6d.

Deals with "most of the common presenting symptoms of disease, both of the body and of the mind".

"Epilepsy and Convulsive Disorders in Children", by Edward M. Bridge, M.D.; 1949. New York, Toronto and London: McGraw-Hill Book Company, Incorporated. 9" × 6", pp. 690, with illustrations. Price: $8.50.

Based on experience at the epilepsy clinic at the Johns Hopkins Hospital.

"Aids to Forensic Medicine and Toxicology", by W. G. Aitchison Robertson, M.D., D.Sc., F.R.C.P.E.; edited by J. H. Ryffel, B.Ch., B.Sc., F.R.I.C.; Twelfth Edition; 1949. London: Baillière, Tindall and Cox. 6¼" × 3¾", pp. 192. Price: 4s. 6d.

One of the well-known "Students' Aids Series".

"Pharmacology and Toxicology of Uranium Compounds: With a Section on the Pharmacology and Toxicology of Fluorine and Hydrogen Fluoride", edited by Carl Voegtlin, Ph.D., and Harold C. Hodge, Ph.D.; First Edition; Parts I and II; 1949. New York, Toronto and London: McGraw-Hill Book Company, Incorporated. 9" × 5¾". Part I, pp. 524; Part II, pp. 560, with illustrations. Price: $10.00, two parts (not sold separately).

This work is one of a series which has been prepared as a record of the research work done under the Manhattan Project and the Atomic Energy Commission.

"Synopsis of Hernia", by Alfred H. Iason, M.D.; 1949. New York: Grune and Stratton, Incorporated. 8½" × 5½", pp. 516, with 98 illustrations. Price: $6.50.

The author has aimed to produce an "integrated total picture" which is "concise enough for practical everyday use".

The Medical Journal of Australia

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Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

THE NUFFIELD FOUNDATION IN RETROSPECT AND PROSPECT.

About twelve months ago the third report of the Nuffield Foundation was discussed in these columns. It was shown that the activities of the Foundation, which are of the utmost importance to the development of the medical and allied sciences in the British Commonwealth of Nations, cover an enormous field. It was also explained that the Foundation was approaching the end of its first five-year grant period. The fourth report, covering the year ended March 31, 1949, has been issued, and marks the end of the first planned period of the Foundation's activities. The period covers six years. The first year, 1943-1944, was devoted chiefly to the devising of a programme which was completed by the end of the sixth year—at the end of March, 1949. The present or fourth report therefore calls for close scrutiny, because it reviews the Foundation's first quinquennium and forecasts the second.

The attitude of the Nuffield Foundation to the medical sciences is carefully explained. The emergence of medicine as a science gave to man benefits which it would be difficult to assess; but at the same time there arose a danger that the bounds of medicine might be set within the walls of the hospital, the laboratory or the surgery. "Control of the epidemic diseases which scourged the community during the era of swift urbanization, and increasing skill in the treatment of some of the diseases most expensive of child and early adult life, have begun to make possible some reorientation of medical interest towards the new task of defining, maintaining, and promoting the best conditions of health." It is to this reorientation that the Foundation adheres, and we are reminded that the reorientation has implications outside those properly regarded as medical. Adherence to this reorientation has not been complete, for the Foundation "has recognized a need to further investigation of the commonest and crippling conditions which, because they have not the dramatic urgency of some of the killing diseases, may have tended to be less studied". Two conditions studied by the Foundation have been rheumatism and catarrh.

In the field of child health the Foundation's notable achievement has been the creation of the "Institute of Child Health" in the University of London. Professor A. A. Moncrieff was appointed to the chair in January, 1946. In addition to the care of sick children, the aim of the Foundation has been the study of normal child development and the teaching of child health. The Foundation also made a grant to a joint committee of the Royal College of Obstetricians and Gynæcologists, the Population Investigation Committee and the Institute of Child Health for a survey of the first two years of life of all children born in one week in March, 1946. (See The Medical Journal of Australia, May 7, 1949, page 621.) In the study of industrial health, departments have been established in the Universities of Manchester, Durham and Glasgow. Research in dental health has been undertaken at Durham, Leeds, Manchester and Guy's Hospital, London. Normal health has been investigated at Oxford by radiological investigation and by surveys of men and women students. The Foundation's investigations into chronic rheumatism were mentioned in our discussion of the third report last year; the Oliver Bird Fund, an auxiliary fund administered by the Foundation, was also referred to. We are now told that the clinical side of the work has been fully organized and that a rheumatism service is running at Manchester, Withington and Buxton. The clinical research that is being carried out includes a controlled study of the value of X-ray treatment in ankylosing spondylitis and a parallel series of injection treatments in rheumatoid arthritis. Pathological investigations are also being undertaken. Investigations into nasal catarrh at Manchester have given clear indications of the importance of allergy as a frequent cause; when infection is responsible a high rate of recovery has followed treatment. The activities of the Foundation in the natural sciences and social sciences are also described. The former are discussed under the headings of physical research, research in metallurgy, agricultural and soil science, the reflecting microscope, and biological research. The latter include economic and social research, legal studies and administration and management.

The aim of the Foundation in the next quinquennium will continue to be "the promotion of the health and well-being of mankind". In order to achieve this aim, the Foundation "will strive to aid not only the advancement of knowledge but also its better co-ordination and the application of existing knowledge to problems of contemporary importance". The Foundation will be prepared to assist the work of individuals or of groups of workers of exceptional ability or promise in any branch of the medical, natural and social sciences, which, nearly or distantly, may contribute in some way to the promotion of human health and welfare. This is an interesting statement, for it is so comprehensive that it can be held to include almost any subject in biology and social studies. A glance at the appendices to the report, where details of fellowships, scholarships and awards are set out, will show that, though the objectives of the endowments have covered a wide range, they are all desirable and show that the managing trustees (presumably they are responsible) are gifted with imagination as well as understanding. This is clear when we note what has been and is being done for the aged poor, for the Association of Universities of the British Commonwealth by means of a grant, for an experi-

mental reception centre for homeless and insecure children, for the Medical Research Society to enable it to purchase the journal *Clinical Science*, for the International Institute for the Conservation of Museum Objects, and so on.

The granting of fellowships, scholarships and other awards must be mentioned. It is of special interest to Australians, and many awards have been made to graduates from this country. The present policy will continue. The Foundation aims to develop a traffic within the Commonwealth of persons of various seniorities. Permanent fellowship schemes have not been established, because for the present the Foundation is content to experiment. One point of importance, on which stress has often been laid in these columns, is that persons from the Dominions who enjoy fellowships in Britain are expected, after they have gained knowledge and experience, to return to their own countries. A "traffic within the Commonwealth" has been advocated in this journal from time to time and we look forward to the day when the traffic will be a two-way traffic—when graduates from the Mother Country will undertake studies in the Dominions. It is not presumptuous to suggest that Britain might find that study of social conditions and problems in the overseas Dominions would be useful to investigators from the Home Country. Whether the time for such a two-way traffic has arrived or not, Australian workers in medicine and science will watch the activities of the Nuffield Foundation during the next five years with sustained interest.

Current Comment.

REPLACEMENT TRANSFUSION.

THE technique of performing blood-letting and transfusion at the same time for a patient is not as new as we might think. M. Bessis, in an article dealing with the possible applications of this method, remarks that its use was known and even practised in the seventeenth century, in spite of the hazards of incompatibility, which were not understood at that time.[1] Naturally the outcome was fatal in a number of cases, whereas we now regard it as a measure to be applied only for sound reasons, and with scrupulous care of technique, but as yet as a life-saving procedure. The present author is not concerned with a single replacement transfusion, but with a series, the patient having his blood replaced repeatedly from a number of different donors. The realization of this idea was first accomplished as recently as 1946.

At the Research Laboratory of the National Centre of Blood Transfusion in Paris work has been proceeding for some ten years on the experimental side of this problem, and a satisfactory method was worked out on dogs. Since the war the work has been given fresh impetus by the great advances in knowledge in the Rh factor and hæmolytic disease of the newborn. Though this method was successful in the treatment of the young infant, there were difficulties with adults, as the risk of incompatibility from irregular agglutinins was not negligible, but the strides made in this branch of immunology encouraged further work. At first Bessis and his colleagues carried out replacement transfusions only on a limited scale, and on patients with incurable diseases. Now they have experience derived from a series of 190 replacement transfusions in children and adults and have had no serious accident. In some of their earlier cases the results were not striking, but later experience has shown them that sometimes failure may be turned into success by repeating the transfusions. By *total* replacement they mean replacement of 85% to 95% of the patient's blood volume by introducing two or three times the total volume by serial infusions. It has been found that when the amount introduced equals the patient's blood volume the percentage of transfused blood present in his circulation is 63; with the introduction of twice his volume this percentage rises to 86, and with three times, to 95. The quantity of blood needed is considerable, raising a problem with donors; the author uses the blood of donors with identical A B O and Rh groups if possible, or O group blood after neutralizing the anti-A and anti-B agglutinins. Any adverse result of introducing a large amount of citrate is countered by the intravenous administration of calcium. Latterly it has been found advisable to use heparin, as the lowered clotting time in the patient makes the withdrawal of blood difficult. The donor blood is introduced on one side, and the blood withdrawn on the other, a long plastic catheter being used, but alternatively Bessis finds it easier to use a catheter in a large vein, in which the passage of blood is so rapid that addition and subtraction can be performed in the same vessel without handling the same blood twice. A special reversible electric pump is used. It has been found possible to draw from the patient and to transfuse a total of 16 litres of blood in three hours. Reactions were not encountered more frequently than in ordinary transfusions.

The indications for this procedure are interesting. They fall into two categories, the presence of toxic substances in the blood, and the presence of a blood disease like acute leuchæmia. In the former are included hæmolytic disease of the newborn, severe intoxication, as from benzol, the circulation of toxic substances arising from the patient's own tissues, such as in incompatible transfusion, in the crush syndrome, in septicæmia, and in anuric nephrosis, which is so often a dangerous sequel of these conditions. In fact, Bessis thinks that the renal circulatory and excretory emergency of anuria is the most important indication. Acting on the assumption that the patient may recover if he can but be tided over the period in which the kidneys fail to excrete as the result of severe tissue insult, the author has used this method in the treatment of seven patients, all of whom recovered. It is, of course, always hard to say what the result of treatment is in this grave emergency, and a larger series is desirable.

The use of replacement transfusion in leuchæmia is based on the idea that in this disease a hypothetical anti-leuchæmia substance is absent from the blood, but present in the blood of normal persons. Bessis produced clinical remissions in 30 out of 38 patients; half of these showed also blood remissions, and six had remissions also in the bone marrow. Further developments of this work will be watched with interest.

[1] *Blood*, April, 1949.

THE EFFECT OF ALCOHOL AND EXERTION ON THE SEQUELS OF HEPATITIS.

THE great interest taken in infective hepatitis during and after the war has been due in part to its relation to homologous serum jaundice, its method of propagation, and its occasional serious sequels. The question of sequels has raised again various inquiries about hepatic cirrhosis, a condition which once almost automatically brought up the causal relationship of alcohol, though it was well known that there must be other important ætiological factors. The study of numbers of servicemen and servicewomen with both the ordinary variety of infectious jaundice and that arising after the inoculation of human serum, often in incredibly small amounts and after a long latent period, has directed attention to a matter believed to be of considerable clinical importance. This is the influence of exertion, or even physical activity which would not be excessive for a man in full health, on determining relapses and perhaps sequels. Once it was thought that sequels after this disease were very rare; some authorities rashly denied their existence. Now it is

known that they are of importance, and work on biopsies has shown that the liver suffers obvious damage even in some people who make good recoveries.

Horace T. Gardner, R. A. Rovelstad, D. J. Moore, F. A. Streitfeld and Marjorie Knowlton carried out an inquiry among American occupation troops in Germany in order to obtain definite controlled information concerning the effect of alcohol and physical activity on the sequels.[1] No distinction could be drawn between the usual type of the disease and that following inoculation of material containing pooled serum, so the two conditions are considered together. All patients who had been admitted to hospital at a hepatitis centre were recalled after a period of six to twelve months for further inquiry and study. Every effort was made to exclude other toxic forms of hepatitis, such as that due to carbon tetrachloride. The group studied was representative, the ages of the men ranging from nineteen to thirty-six years, and the illness they had was not unduly severe. Prior to the illness they had been in good health, and had been taking a good varied diet. Careful physical examination was made on their return, and a series of tests of liver efficiency carried out. These comprised tests concerned with cephalin-cholesterol flocculation, thymol turbidity, serum bilirubin, urine bilirubin, bromsulphthalein excretion, and urine urobilinogen. A group classed as "presumably cured" showed a higher rate of residual reactions than those marked "convalescent". Some of the residuals consisted only of reaction to a single test, suggesting a lowering of hepatic efficiency. The patients were classified according as they had undergone heavy, moderate or light exercise. Before being discharged from hospital, they had nearly all been carrying out graded exercise. They were also classified according to the amount of alcohol they drank, an arbitrary standard being laid down. Very few patients complained of any symptoms; a few had mild indigestion, right upper-quadrant pain, or intolerance to fatty food. One man had spider telangiectases on the chest, and the liver was enlarged and tender. Analysis of the results shows that no effect of either alcohol or exertion could be proved, and the authors conclude that neither exertion nor alcohol consumption during convalescence played a significant part in determining the appearance of residual disturbance of liver function. No biopsy examinations were performed.

This work might be worth repeating in another place at another time if the opportunity presented. It is inconclusive as it stands, and it may be pointed out that the clinical evidence supporting some connexion between residuals and factors such as alcohol and exertion has been based on those patients who have presented definite clinical signs of liver disturbance. This is a disease which, like many other infections, differs greatly in its severity in different outbreaks; it is known, too, that the liver often shows some microscopic changes, but fortunately recovery usually takes place. In the meantime it would be wise to advise convalescents to moderate both their intake of alcohol and their output of physical exertion.

[1] *Annals of Internal Medicine*, May, 1949.

MERCURIAL POISONING FROM FINGERPRINTS.

THE policemen whom W. S. Gilbert matched against the pirates of Penzance were no doubt good fellows—kindly, imbued with a sense of duty and courageous in their fashion—but their intellectual outlook was unquestionably limited. They would not have dreamed of emulating the omniscient Major-General Stanley. Times have changed and the range of constabulary duty and knowledge has widened greatly. Indeed, if Gilbert returned to rewrite his libretto today, he would quite likely transfer the Major-General's famous song to the Sergeant of Police and make the refrain run something like this:

> In short, in matters animal, mineral and vegetable,
> I am the very model of an up-to-date constable.

There would, of course, be additions to the catalogue of knowledge and not the least would be the mastery of the fingerprint. The recording and study of fingerprints really form a skilled and valuable aspect of the investigation of crime, but at least we might have expected it to be a safe part of an occupation which is not without hazard in other ways. This it seems is not so, as John N. Agate and Monamy Buckell[1] have found mercury poisoning amongst men engaged in the investigation of latent fingerprints. As even the most elementary student of fictional crime knows, the film of sweat and grease on the fingertips of an evildoer who is not at pains to avoid the happening will leave a latent print on furniture, doors or movable objects at the scene of the crime; by means of appropriate technique these prints may often be developed and photographed for comparison with fingerprints of suspects and for recording. Developing is done by applying a finely divided powder—a light-coloured powder on a dark background, or a dark powder on a light background—with a soft flat brush, the excess being brushed or blown off. The powder most commonly used in British and United States police forces is mercury-with-chalk or grey powder (*Hydrargyrum cum Creta* of the British Pharmacopœia). The Lancashire Constabulary, Agate and Buckell state, set particular value on fingerprint work and employ a body of men who are specially trained for it. Certain of these men, it was found, inevitably worked with grey powder for long periods—certainly for several hours each week—and the risk of chronic mercury poisoning could not be ignored. The powder is dry and finely divided; it is applied liberally from a well-loaded brush; the brush itself is often cleaned by being rubbed against a convenient door post, and powder rises in a cloud. At the end of the operation excess powder may be left lying about in the room while investigations are going on. Some men wear gloves at work, but none wear dust-masks. Grey powder has been used in this way in the Lancashire Constabulary since 1936, and recent consumption of it has been at the rate of five pounds a month. When the risk of mercurialism was recognized the officer in charge of the men and 31 of the 32 members of his staff volunteered for examination. The three main manifestations of mercury poisoning are stomatitis, with retracted spongy bleeding gums, loosening of the teeth, *fœtor oris* and salivation; a coarse intention tremor of the whole of one or both hands or arms and sometimes involving the lips, tongue, eyelids, lower limbs and muscles elsewhere; and erethism, a psychological disturbance most inappropriate to policemen, in which the patient becomes diffident, timid and easily embarrassed, tending to blush easily, and may become short-tempered and object to being watched. Of the 32 men examined seven were found to have evidence of mercurialism; all seven had tremor of characteristic type, three had evidence of past or present erethism, but there was no evidence of bleeding gums or stomatitis. The seven affected men had all had protracted exposure to grey powder. By contrast a group with limited exposure showed no sign of mercurialism. It seems that exposures of 250 hours or more per year constituted a real risk, although in one case the recent exposure had been much below this figure. Urinary mercury estimations were of no assistance in the diagnosis of individual cases or the estimation of exposure, but the average excretion of the group was abnormally high. In all cases the condition was mild, but it is clear that a significant occupational disease has been uncovered. Agate and Buckell state that masks and gloves do not constitute a practical solution to the problem, and it seems best that the use of grey powder should be abandoned if a suitable substitute is available. Apparently a suitable substitute has now been found and the Lancashire Constabulary have ceased to use grey powder; no doubt others will follow their example. The whole situation provokes an interesting reflection on the psychology of the stool-pigeon. A thief was set to catch a thief—Quicksilver to catch Quickfingers—and from the place of trust the ill was worked. If we take one consideration with another a policeman's life certainly presents a variety of hazards.

[1] *The Lancet*, September 10, 1949.

Abstracts from Medical Literature.

PÆDIATRICS.

Study of Bone Marrow in Infants and Children.

HENRY G. PONCHER (*American Journal of Diseases of Children*, September, 1948) discusses the anatomy of the sternum, the technique of sternal puncture and the changes found in the sternal marrow in certain diseases of infants and children. He admits that trephining may provide a better specimen for study, undiluted with blood, but he prefers sternal aspiration because of its simplicity. He states that the most accessible site for aspiration in children beyond the neonatal period is just below the sterno-manubrial ridge, in the space between the second and third ribs, and slightly lateral to the mid-line of the sternum. It is important to know the thickness of the anterior lamina of the sternum, which varies from 0·5 millimetre at birth to 2·0 millimetres in later childhood. The author does not discuss in detail the examination of the marrow cells, but he describes the changes found in the various types of anæmia of infancy and childhood, in the various diseases causing splenomegaly and lymphadenopathy, in purpura and hæmorrhagic disorders, in myelomatosis, agranulocytosis and protozoal infections. The procedure is of diagnostic value in leuchæmia, megaloblastic anæmia of infancy, myelomatosis, malaria and leishmaniasis, and in some cases of Gaucher's and Niemann-Pick disease, in xanthomatosis and occasionally in metastatic malignant disease.

Glutamic Acid and Mongols.

FREDERIC T. ZIMMERMAN AND B. B. BURGEMEISTER (*The American Journal of Psychiatry*, March, 1949) found that glutamic acid accelerated both the mental and the physical growth of mongols. Weight and height were most conspicuously increased, and the texture of the skin and hair also appeared more normal. The improvement in the mental growth was not as great as that of children with non-mongoloid retardation. The glutamic acid was administered in gradually increasing doses to a point where an optimum increase in motor and psychic activity was apparent; the effective dose ranged between 24 and 36 grammes per day. Signs of overstimulation result in distractibility and aimless physical activity.

Gargoylism.

STUART LINDSAY *et alii* (*American Journal of Diseases of Children*, September, 1948) present a detailed study of gargoylism. They describe the clinical and autopsy details in eight cases and the clinical and surgical pathological findings in four additional cases. They point out that the disease is characterized by the intracellular and extracellular deposition and storage of a substance that gives the histochemical reactions of glycogen. Certain data suggest that the glycogen may be combined with a protein. In true glycogenosis (von Gieke's disease) storage of glycogen is associated with demonstrable alterations in carbohydrate metabolism, but no such alterations were found in these cases. The gross and microscopic changes found were very widespread, affecting almost all tissues of the body, and consequently the clinical manifestations are protean.

Influenzal Meningitis.

JOSEPH YAMPOLSKY AND JOHN PAUL JONES (*American Journal of Diseases of Children*, July, 1949) review the literature on the treatment of influenzal meningitis, discussing particularly Hoyne's opposition to intrathecal therapy, and report the results of treatment in 22 cases of their own in the last two years. There were three deaths, and nineteen of their patients are alive and well. Ages varied from one day to seven years. The treatment given consisted of sulphadiazine and streptomycin; the former in a dosage of one and a half grains per pound of body weight per day, given by mouth when possible, but if necessary subcutaneously or by way of intravenous drip apparatus; the latter in a dosage of one gramme daily in eight doses by intramuscular injection and 30 to 32 milligrammes by intrathecal injection daily. The streptomycin was continued for four to seven days, depending on the condition of the patient and the condition of the spinal fluid. Most patients received an initial dose of 5000 units of penicillin by intrathecal injection before the nature of the infecting organism was established. Anti-influenzal rabbit serum was used in only two cases. The authors feel that streptomycin has rendered it unnecessary. Toxic symptoms from streptomycin were negligible. There were one case of temporary deafness and several cases of albuminuria.

Urethral Stricture.

MEREDITH F. CAMPBELL (*The Journal of Pediatrics*, August, 1949) emphasizes that congenital stricture of the urethra is a very common lesion in children, occurring in about one-fifth of the children he examines because of urological disturbances. He states that urinary infection often follows this condition and causes inflammatory change at the site of the stricture. Obstruction tends to be progressive and dilatation of the urinary tract behind the stricture occurs. Symptoms are urinary difficulty, frequency, hesitancy, terminal dribbling, occasional hæmaturia, enuresis. Persistent pyuria and gradually increasing urinary toxæmia may develop with failure to grow, anorexia and sluggishness. Meatal ulcer is a common complication among boys. Treatment is by meatotomy and dilatation of the urethra. Inflammatory and traumatic strictures do occur in children and should not be overlooked. Treatment is by gentle persistent dilatation.

Tonsillectomy and Streptococcal Infections.

MAX MICHAEL (*The American Journal of Medicine*, April, 1949) discusses the role of tonsillectomy in the management of recurrent streptococcal sore throat, rheumatic fever and glomerulonephritis. He states that patients with repeated episodes of acute severe sore throat can be expected to have a decreased number of attacks after tonsillectomy. The available evidence does not indicate that tonsillectomy will prevent or appreciably alter the course of acute rheumatic fever or of acute glomerulonephritis, or that it will diminish the incidence of recurrence of these diseases. The author points out that tonsillectomy is frequently recommended with claims that dramatic changes in health will ensue, but no attempt has been made to go into the effect of the procedure on the growth, development and general health of the child. The operation is not completely without risk; rare though complications may be, they do include fatal hæmorrhage and pulmonary abscess, and furthermore, evidence seems to indicate that the operation increases the likelihood of development of the bulbar form of poliomyelitis during an epidemic period. He concludes that when all factors are weighed, it would seem that tonsillectomy is not a completely innocuous procedure and should not be performed indiscriminately. Each individual case must be considered on its own merits.

Sequelæ of Infective Hepatitis in Children.

W. G. WYLLIE AND MARGARET E. EDMUNDS (*The Lancet*, September 24, 1949) report twelve cases of infective hepatitis, six of them fatal, to illustrate the possible sequelæ of the disease. They discuss the relation of chronic hepatic damage to infective hepatitis in children. They state that there is apparently no means of telling, in the initial attacks of jaundice, which patient will recover and which will not.

ORTHOPÆDIC SURGERY.

Open Wounds of the Brachial Plexus.

D. M. BROOKS (*The Journal of Bone and Joint Surgery*, February, 1949) examined 42 cases in which the brachial plexus was damaged by penetrating wounds. In many of them paralysis was at first complete; but rapid recovery occurred in part of the plexus within a few weeks, leaving residual paralysis, which was slow to disappear and from which recovery was often imperfect. All patients were treated by electrical stimulation of the paralysed muscles until voluntary control was restored or until it became evident that no recovery would occur. Observations were continued for at least two years after injury and in many cases for three or four years. In 22 cases operative exploration of the plexus was undertaken because there was a severe lesion involving the whole plexus, a complete lesion of a localized part of the plexus such as the upper trunk, or persistent pain in the limb. In no case was it considered justifiable to resect a lesion in continuity, and in only four was a nerve found to be divided, repair being possible in three. There was an average delay of six months between the time of injury and operation, the earliest exploration being after one month, and the latest after thirteen months. The author states that exploration of the nerves showed (i) no obvious change; (ii) a "degenerative appearance" of the nerve—a grey-pink translucent appearance which is characteristic and may be due to the disappearance of myelin (when no neuroma was found this appearance

was presumed to indicate axonotmesis); (iii) nerve enveloped in scar tissue, with or without evidence of constriction; (iv) neuroma—(*a*) fusiform, hard or soft, and (*b*) lateral; (v) interruption of continuity. Intraneural scarring was never found by itself; in every case it was seen in association with a neuroma. There is no evidence to suggest that neurolysis influenced motor or sensory recovery, but on one occasion it relieved persistent pain in the limb. In general the correlation between operative findings and prognosis was not precise. With one exception, no recovery of consequence took place in the small muscles of the hand after a lesion in continuity, although galvanic stimulation to all paralysed muscles had been given regularly. In every case of damage to a main vessel there was a great tendency to joint stiffness, particularly in the hand, but on one occasion only was there evidence of ischæmic changes in the muscles and nerves. When the upper trunk alone was affected good recovery occurred regularly. There is evidence to suggest that innervation of the biceps may not always be limited to the fifth and sixth cervical nerves and that in a proportion of cases the seventh cervical nerve may make a substantial contribution. On the whole recovery in cases of posterior cord lesions was good. The author points out that, as in upper trunk lesions, relatively no distal muscles are innervated by the posterior cord and the length of axonal regeneration is therefore not unduly great. In cases of complete degenerative lesions of lower trunk or medial cord the final recovery was disappointing. The author concludes that the routine exploration of open wounds of the brachial plexus is neither profitable nor justified.

Fractures of the Patella.

J. C. SCOTT (*The Journal of Bone and Joint Surgery*, February, 1949) reviews a series of 196 fractures of the patella treated in various ways. The average time of post-operative disability varied from 3·6 to 5·3 months, being appreciably less when operation was carried out before the fourteenth day. An attempt was made to follow up, two to five years after injury, those patients in whom the result was not influenced by other major injuries of the limbs or by unexpected complications; all regained a good range of movement, whether treatment was by excision of part or all the bone, or by open reduction and suture. Considerable residual disability followed excision; after total excision only 5% of patients considered that the knee was normal, 90% complained of aching and 60% complained of "giving way"; after excision of one fragment, about half the patients regarded the knee as normal and half complained of aching and stiffness. The analysis does not show whether the disability was due to excision of bone or whether it was the inevitable consequence of the original injury. The author states that for vertical or marginal fractures, all fractures without displacement, and polar fractures where the extensor mechanism is intact, no operative intervention is indicated. The only treatment indicated for fractures in which the whole bone is comminuted and the fragments are separated is excision of the fragments with suture of the extensor apparatus. Other varieties, lying between these extremes, call for much more thought. With eccentric fractures, whether transverse or comminuted, where more than half the bone and articular cartilage is intact, the small fragments should be removed and the quadriceps expansion or patellar tendon fixed to the main fragment. For central transverse fractures, open reduction and internal fixation is probably the best treatment, but only if reduction is accurate and fixation adequate; unless it is possible to secure and to maintain anatomical reduction, excision is probably better. The author states that the review suggests that the best duration of post-operative immobilization is from three to four weeks; during that time the patient should practise static quadriceps contraction and may be allowed weight-bearing after the tenth day.

Osteoclastoma.

B. W. WINDEYER AND P. B. WOODYATT (*The Journal of Bone and Joint Surgery*, May, 1949) report a series of 38 cases of osteoclastoma. More cases occurred in females than in males, just over half occurred in the second and third decades, and in seven there was a definite history of injury preceding symptoms by several months. The authors state that it is often difficult to arrive at a diagnosis on clinical and radiographic findings alone. Histological information is usually necessary; a limited biopsy is safe and reliable. When the lesion is a slowly growing and typically expanded and trabeculated tumour, situated at the end of a long bone, radiological without histological examination may be sufficient; but in cases with rapid growth and no evidence of trabeculation or expansion of the cortex, in which the tumour occupies an unusual site, radiographic examination alone is not sufficient. Malignant change with the development of metastases occurs in a small proportion of cases, regardless of the particular treatment that has been employed. Methods of treatment used included curettage or local excision, with or without irradiation, and irradiation alone. It is to be noted that, in this limited series, malignant change occurred in a higher proportion of cases in which treatment was by curettage and radiotherapy than when radiotherapy alone was used. The authors conclude that radiotherapy alone is the treatment of choice, unless complete excision of the tumour is possible, without disability, for example, when it is situated in the head of the fibula or the lower end of the ulna, the ribs or the patella.

Displacement in Fracture of the Femoral Neck.

P. LINTON (*The Journal of Bone and Joint Surgery*, May, 1949) believes that various types of fracture of the femoral neck represent different stages of one and the same displacing movement. The displacing movement begins with the femoral head in slight abduction or valgus, and it ends when the head is on the posterior aspect of the femoral neck in adduction or varus; the displacements are the consequence of a single rotatory movement of the head. The displacement first produces an "abduction fracture" and terminates in an "adduction fracture", passing through the stage of an "intermediary fracture", which is less well recognized. These three types of fracture occur in response to the same injury and they differ only in the degree of displacement. Certain abduction fractures, while under observation, have changed in their position and thereafter shown the typical displacement of adduction fractures. It is a mistake to believe that in "adduction fractures" the femoral head lies medially to the collum; it lies posteriorly. "Impaction" is no more than the first stage of displacement of fractures in which there is limited displacement, with contact still maintained between the fragments. An "impacted fracture" is not necessarily stable—if there is additional strain it may progress to the next stage of a displaced and unstable fracture. The mean age of patients who sustain abduction and intermediary fractures is lower than that of patients who sustain adduction fractures. The difference is considerable, and it is statistically significant. This must be interpreted in terms of the greater power of skeletal resistance at younger ages, so that at these ages the degree of displacement is arrested at an earlier stage.

Premature Epiphysial Fusion at the Knee with Tuberculous Hip Disease.

W. PARKE, G. S. COLVIN AND A. H. G. ALMOND (*The Journal of Bone and Joint Surgery*, February, 1949) have reviewed a series of 91 tuberculous hip joints and found that in 29 cases premature epiphysial fusion occurred at the knee. They state that premature epiphysial fusion at the knee joint is due to rupture of the epiphysial cartilaginous plates consequent upon resorption of cancellous support and suppression of osteogenesis. In the tibia, premature fusion is usually preceded by near-central "bulging" of the metaphysial and tibial marrow through the epiphysial plate. In the femur, epiphysial changes preceding fusion are of a fragmentary type. Premature fusion is indicated by the appearance of many small isolated fragments of calcific material replacing the crenated line of the terminal bone plate, which normally is well defined and continuous. The tibial epiphysis was involved in 26 cases and the femoral epiphysis in 17. The "bulge" type of fusion was responsible for 21 out of 26 tibial fusions. With one exception, the femoral and tibial epiphyses in the normal limb did not show evidence of premature fusion; neither did the epiphyses at the ankle, or at the upper end of the fibula, even on the diseased side. Premature fusion was not found during the first two years of the disease; early fusion develops sometimes in between three and five years. The liability to premature fusion is not influenced by the age of the patient at the time of onset of the disease. There is a close relationship between the severity of disease in the hip and fusion around the knee. Fusion occurs least frequently with extra-articular and synovial tuberculosis, and most frequently when there is typical disease with pronounced destruction of bone, especially when complicated by persistent sinus formation. The fundamental factors responsible for the bone changes causing premature epiphysial fusion are toxæmia from the infection at the hip, prolonged immobilization and the duration of action of either of these factors. The authors consider that in cases in which treatment is conservative for long periods, the incidence of premature fusion, with serious shortening of the limb, is so high that the wisdom of such treatment must be reconsidered.

Special Abstract.

HAIR AND SCALP TREATMENTS AND PREPARATIONS.

THE Committee on Cosmetics established by the American Medical Association to study cosmetics as they are sold to the American people has issued a report on hair and scalp treatments and preparations[1] which is of considerable importance and interest. It is in the main concerned with preparations and treatments offered to the public by non-medical persons, which, it is either claimed or implied by those offering them, will prevent or cure baldness. In the view of the Committee, most of the results claimed or implied are impossible, despite the accompanying use of high-sounding terms with an impressive medical or scientific tang. The following is a summary of the main points of the report.

Hair and Scalp Treatments.

The methods used by the majority of those claiming to treat the hair and scalp fall into familiar patterns; rarely is originality shown. The preparations promoted have the usual hair "tonic" formulæ, consisting essentially of an antiseptic, an irritant or a keratolytic substance. The hair "tonics" are usually applied with massage, which is claimed to increase the circulation, thereby stimulating cell activity, and consequently favourably influencing the growth of hair. There is no proof that the temporary increase in blood supply to the area massaged postpones the loss of hair or in any other way influences baldness. In some cases mechanical devices are employed, such as electric brushes, vibrators or a suction apparatus, for the purpose of increasing circulation. Failure is the same as with manual massage. Rarely, continued massage may produce a fine, colourless, fuzzy down, similar to that seen on the heads of some new-born babies; but this "fuzz" cannot be considered either in length or appearance to be a real growth of hair or a precursor. Frequently, after reaching a length of about half an inch, the "fuzz" drops off, and is not replaced. In any event, its appearance is without cosmetic value, since it is invisible except on close well-lighted inspection.

The use of ultra-violet lamps has achieved some popularity. In trained hands ultra-violet rays have a degree of usefulness; but only those whose scientific background makes them capable of understanding the limited available data and the potential health hazards should undertake the supervision of such treatment.

Treatment is sometimes offered by mail order, and claims are made to diagnose scalp conditions by microscopic examination of a few strands of hair sent through the mail. Although certain physical characteristics of the hair can be observed with a microscope, such as whether or not it is human or dyed or permanently waved or contaminated with foreign matter, the physiological condition of the scalp cannot be determined by such examinations.

Hair "Tonics".

Hair "tonics" enjoy a ready sale; but despite the ideas associated with the term "tonic", there is no evidence that these preparations do more than groom the hair. The majority of conventional products have similar basic formulæ, among the common ingredients being acetic acid, resorcinol compounds, salicylic acid, mercuric chloride, sulphur and β-naphthol. The past history of each of these chemicals after repeated use in many hair preparations indicates that they are ineffective in growing or maintaining hair or in curing dandruff. Disappointment and futile expenditure of money will result from the use of hair "tonics" for these purposes, and the possibility that certain of the ingredients may cause severe dermatitis is ever present.

Sulphonamide drugs have been incorporated in hair "tonics", in spite of the fact that intensive clinical and laboratory research indicates that their use in this way is worthless. In addition, the well-known dangers associated with the development of sensitivity to the drug and of resistant strains of organisms must be borne in mind. Chemotherapeutic agents should in all instances be used only under medical supervision.

Hormones are included in some brands of hair "tonics", but evidence is lacking that hormones applied in any form to the scalp will influence the growth of hair in the presence of ordinary baldness. Hormone activity and the amount and distribution of hair are associated in ways not yet fully understood; but the use of hormones for the treatment of baldness must be regarded as potentially dangerous. Under no circumstances should hormone therapy be used unless definite evidence of hormone dysfunction prevails, and such dysfunction is not diagnosed solely on the basis that the person has lost or is losing his hair. The fact that hormones are absorbed through the skin, and in large enough amounts can cause systemic changes, indicates the need for caution.

Vitamins do not influence ordinary baldness. Claims have been made of success resulting from the injection of vitamin *B* into the scalp; but scientific support for these claims is lacking. The injection of any substance into the scalp is a highly questionable and risky procedure, since the amounts of subcutaneous fat and the thickness of the muscular layers are not conducive to absorption of a foreign substance. In addition, only substances of carefully controlled sterility and physical characteristics can, with any degree of safety, be injected.

The advertising of hair "tonics" depends a good deal on the creation of a "bald-conscious" public and on the germ theory of dandruff, with an emphasis on the use of antiseptics, although there is at present little justification for this. The suggestion is also made that itchiness of the scalp leads to dandruff, which in turn is a precursor of baldness. The physiology of itching indicates that both functional and organic causes must be considered. Functional pruritus, in which there are no visible changes on the scalp, is a fairly common affliction. When attention is concentrated on the scalp during periods of inactivity, fatigue or tenseness, minimal pruritus becomes noticeable. In addition, the repeated use of drying shampoos may lead to more apparent flaking of the skin and itching, which is temporarily relieved by shampooing. In those instances in which there is definite scalp disease, of which itching is a symptom (not a cause), diagnosis and treatment are medical matters. The use of irritants depends upon the idea that an increase in blood supply to the scalp is beneficial. The fallacy of this has already been discussed, and it should also be noted that the chemicals used as rubefacients can cause sensitization, and their indiscriminate use may increase rather than decrease so-called dandruff.

Testimonials are much used in the advertising of hair "tonics" and other forms of treatment. However, even those written in good faith are not necessarily reliable evidence. It is important to know that in some instances hair grows on a previously hairless head, but not as a result of any external application or treatment. For example, about three months after prolonged febrile illnesses, severe nervous shocks or trauma, scalp hair may fall out completely, or a rapid general thinning of the hair may take place. At other times the hair falls out in patches, producing a condition known as *alopecia areata*, or the entire head and orbital areas are left without hair. These instances can be differentiated from ordinary baldness by the lack of characteristic patterning which occurs with the latter, first in an area above each eye and at the vertex of the head; both areas eventually merge, but hair will remain at the periphery. After symptomatic loss of hair, regrowth usually takes place as a result of the forces of Nature and not of any external application.

Simple Dandruff.

Dandruff is actually a manifestation of a normal physiological process. Dead keratinized cells are constantly being shed over the entire skin surface. On the scalp the process is more noticeable and objectionable. The varying degrees of dandruff among individuals may be due to obvious physical factors or to constitutional predisposition, and may be aggravated by the continuous use of synthetic detergent shampoos, the excessive use of irritating hair lotions or "tonics", overeating of sugars and starches, improper hygiene and poor general health. Simple measures are usually sufficient for its control. Daily gentle massage of the scalp will detach loose dandruff flakes from the scalp, and subsequent brushing will remove the flakes from the hair shafts. Shampooing as often as every three or four days in soft water may be necessary. Synthetic detergents may be drying, and are usually undesirable, but have obvious advantages in hard water areas. Simple hygienic principles dictate that brushes, combs and hats should not be borrowed or lent. If these measures are insufficient, a dermatologist should be consulted.

Seborrhœa of the Scalp.

Seborrhœa is a functional disturbance of the sebaceous glands characterized by an excessive discharge of sebum forming white or yellowish greasy scales on the body. It is not limited to the scalp. Its cause is unknown. There is still no proof that seborrhœa influences loss of hair,

[1] *The Journal of the American Medical Association*, March 26, 1949.

regardless of the fact that it is present on a majority of scalps which are losing hair. As evidence against its being the cause of baldness are the facts that it invariably affects the entire scalp, although the hair is always lost in the characteristic patterns of ordinary baldness; that, despite the extensive distribution of the disease, hair is lost only from the scalp, never from the chest or other areas; and that women who have severe persistent seborrhœa do not lose their hair. All treatment is temporary; the disease is chronic, with periods of quiescence and exacerbation. Frequent shampoos may control it, but more drastic treatment may be necessary. In any case, it is a skin disease and as such requires medical treatment.

Causes of Baldness.

The most common and disturbing form of hair loss is premature baldness, often referred to as premature idiopathic alopecia. Although the oldest prescription on record is for the loss of hair, little more is known today about the actual cause, control or cure than was known then. Premature baldness occurs almost exclusively in men during their second and third decades without any known recognizable disease. The loss of hair occurs in a characteristic pattern which has already been described. The tendency towards premature baldness is hereditary. Although the endocrine glands are known to be an influential factor in the normal growth of hair, their relationship if any to the loss of hair in young men remains a mystery. In all probability frequent washing of hair, tight hats, the continual use of electric lights, hot showers, sedentary city life and similar popularized theories are without significance. Among the changes associated with advancing years is the loss of hair referred to as "senile alopecia". Thinning of the hair of both men and women accompanies aging; however, such thinning is more frequent among men. The problem of senile alopecia from the medical point of view is the same as that of premature alopecia, but the psychological implications of the loss of hair for the young adult are more acute and serious.

Treatment of Impending Baldness.

Advertising designed to promote the sale of hair "tonics" is sometimes aimed at making men "bald-conscious", but unless the fact is obvious, the first consideration should be whether or not a man is actually losing more than an average amount of hair. Some shedding of hair is a normal process, and after any manipulation of the hair, such as shampooing, brushing or combing, a noticeable fall of hair can be expected. In addition the average adult hair line indents somewhat over the eyes, replacing the straight hair line of childhood. Although it is true the male baldness originates in this area, many men have this normal pattern without becoming bald. If the general health of the man is satisfactory and the loss of hair is progressive and in characteristic pattern, the condition is probably premature idiopathic or senile baldness, and medical science does not know any device, substance or method which will regenerate hair in these conditions. Since baldness is, to the best of our knowledge, a result of constitutional factors or a combination of local and constitutional factors, a thorough physical examination should precede the making of a diagnosis. In a few instances a mild glandular disorder may exist, which can be corrected with improvement of the health of the hair. In other cases diets with a high content of sugar or starch may require modification, although the relationship between diet and hair loss is essentially speculative. The medical history of the person may reveal a recent severe physical or emotional strain which may have been responsible for hair loss. In any event, the diagnosis and treatment of conditions responsible for the progressive loss of hair are medical matters, and should be entrusted only to a competent medical practitioner.

British Medical Association News.

SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held at the Royal North Shore Hospital of Sydney, Crow's Nest, New South Wales, on June 23, 1949. The meeting took the form of a series of clinical demonstrations by the members of the honorary medical and surgical staffs of the hospital. Part of this report appeared in the issues of September 3 and 10, 1949.

Pulmonary Tuberculosis.

A series of patients were presented by members of the thoracic unit of the hospital.

Pneumoperitoneum.

DR. COTTER HARVEY discussed a series of cases illustrating the use of pneumoperitoneum in treatment and diagnosis. He said that the procedure had come to be accorded a place among the forms of collapse therapy in pulmonary tuberculosis. It was not as good as an effective pneumothorax or a successful thoracoplasty. It could, however, control disease where the former procedure had failed, and it might enable the latter to be avoided. Indications were variable, and the results were largely unpredictable. It possessed the advantages over artificial pneumothorax of being harmless, and of being entirely reversible, and it could be recommenced at any time. Cases were discussed of apical and basal cavitation and of bilateral disease in which cavity closure had occurred or disease had been apparently arrested after pneumoperitoneum. Other cases were discussed in which the treatment had failed, and recourse had been made to thoracoplasty. Dr. Harvey pointed out that, in most cases, phrenic crush had been carried out on the affected side. It might be said that that operation was rarely performed at the present time unless as an adjunct to pneumoperitoneum. As an additional means of raising the diaphragm, a special corset was used with beneficial results.

The last case considered was one of diagnostic interest. The patient, a male, aged fifty-two years, was in good health, but an X-ray photograph taken five years previously had shown a rounded shadow at the base of the right lung. No treatment had been advised at the time. A further film, taken two weeks before the meeting, showed the shadow to be still present. The radiologist had thought that it might be due to lobular collapse of the lung; another possibility was a hydatid cyst of the liver. Pneumoperitoneum was carried out, 750 millilitres of air being injected into the abdominal cavity. Fluoroscopy, confirmed by an X-ray film, then revealed that both liver and lung were perfectly normal in the area under suspicion. The condition was shown to be an eventration of the diaphragm.

Polythene Plombage.

DR. BRUCE WHITE showed two patients suffering from pulmonary tuberculosis, who had recently been treated by apicolysis with polythene plombage. He pointed out that the technique might be more widely used in the later age group, for example, for those aged forty-five years or over. He said that where cavitation existed in the upper lobe of the lung and where the simpler forms of collapse therapy could not be employed, thoracoplasty was a much more hazardous affair and in some cases was tolerated badly. While it was true that in many such cases the patients might live quite a number of years in "symbiosis" with the tubercle bacillus, they were often a source of great danger to their grandchildren and others. Therefore, any operative procedure with a minor risk compared with thoracoplasty should be welcomed. Dr. White pointed out that operations embodying the plombage technique, namely, stripping of the parietai pleura, along either the extra-fascial or the extra-pleural plane, over the dome of the pleura, and packing of the resultant space with a variety of "plombs", were first performed early in the century; for example, Tuffier used muscle or fat, Morriston Davies and Sebrecht used a pedicle graft of muscle, Sauerbruch used a mixture of paraffin, bismuth carbonate *et cetera*. Others used air (extra-pleural pneumothorax). Those operations were performed with a minimum of rib resection as compared with thoracoplasty. All of them had been tried, again and again, but not with uniformly good results, and had gradually been given up, except that extra-pleural pneumothorax was still used in some countries, particularly on the continent of Europe. In the last two or three years, promising results had been reported from employment of plastic material, the basis of which was methyl methacrolate, in the form of either round spheres (lucite balls) or sheets (similar to "Cellophane"), which were packed into the extra-pleural space. The latter, known as polythene, had been used successfully by Morriston Davies, who, very many years previously, had tried other packs. The use of the plastic bodies must be regarded as experimental but, nevertheless, highly encouraging. Advantages claimed for the use of polythene were, firstly, that it was not hard and unyielding like lucite balls, secondly, that it appeared to be quite effective as a "plomb", and, thirdly, that it was not irritating to the tissues, provoking no foreign body reaction.

Two patients shown were both aged fifty-two years and both had limited disease of the upper lobe of the lung with

cavitation. Dr. White said that Dr. M. P. Susman had employed polythene packs after stripping the lung free from the apex of the thorax along the extra-fascial plane. Both subjects had stood the operative procedures very well. One, a male, aged fifty-two years, had radiological evidence of exudative disease with a cavity in the upper lobe of the left lung. Prior to operation, he expectorated about an ounce of sputum per day. Tubercle bacilli were found. Within six weeks, his sputum became almost negligible in amount, and repeated examinations had failed to show tubercle bacilli in his sputum. Serial X-ray films prepared after the operation showed the upper lobe of the left lung to be well collapsed by the "plomb" and the cavity was no longer present. At the time of the meeting, about four months after the operation, the patient appeared to be very well—in fact he stated that he had never been better in his life.

The second patient, a female, also aged fifty-two years, had radiological evidence of disease of the upper lobe of the right lung with a cavity about one and a half inches in diameter. A similar type of operation had been performed by Dr. Susman with considerable diminution in the size of the cavity, as shown by X-ray films. At the time of the meeting, which was three months later, her condition was much improved, but complete cavity closure and sputum conversion had not yet occurred. It was hoped that that happy result might yet ensue.

Pulmonary Resection.

DR. C. G. BAYLISS discussed the place of resection in the treatment of certain types of pulmonary tuberculosis, including the indications and contraindications. He then showed two patients suffering from pulmonary tuberculosis for which pneumonectomy had been performed. The first patient, a woman, aged forty-four years, had had a contralateral pneumothorax operation twelve months previously, and a small lesion that had been present on that side had apparently healed. The left lung was atelectatic and the seat of gross fibro-cavernous disease. Bronchoscopic examination had demonstrated a fibrosing type of stenosis of the left stem bronchus and bronchography showed a gross sacular bronchiectasis of the corresponding lung. Pneumonectomy was performed in two stages, the first stage consisting of the separation of extremely dense and widespread pleural adhesions. The lung was wrapped in polythene and the thorax closed. At the second stage, three weeks later, the resection was completed and the lung removed. At the time of presentation, the patient's condition was excellent; she was to be submitted to thoracoplasty at a later date.

The second patient was a female, aged twenty-four years, with advancing disease throughout most of the right lung; her left lung was normal. She was also suffering from moderately severe diabetes. In view of her failure to respond to other forms of treatment and an apparently very bad prognosis, she was submitted to pneumonectomy on the right side. She made an excellent recovery, but some weeks after operation developed a broncho-pleural fistula followed by tuberculous empyema.

Dr. Bayliss discussed the problem of the residual pleural space following pulmonary resection for tuberculosis and the questions of if and when thoracoplasty should be performed.

SIR CHARLES HASTINGS CLINICAL PRIZE.

THE Council of the British Medical Association is prepared to consider an award of the Sir Charles Hastings Clinical Prize in the year 1950. The prize consists of a certificate and a money award of fifty guineas.

The purpose of the prize is the promotion of systematic observation, research, and record in general practice. It will be awarded for the best essay submitted in open competition. The work submitted must include personal observations and experiences collected by the candidate in general practice. Candidates in their entries should confine their attention to their own observations in practice rather than to comments on previously published works on the subject, though reference to current literature should not be omitted when it bears directly on their results, their interpretations and their conclusions. A high order of excellence will be required. No study or essay that has previously been published in the medical press or elsewhere will be considered eligible for the prize, and a contribution offered in one year cannot be accepted in any subsequent year unless it includes evidence of further work. The prizewinner in any year is not eligible for a second award of the prize.

Any member of the Association who is engaged in general practice is eligible to compete for the prize.

If any question arises in reference to the eligibility of a candidate or the admissibility of his essay, the decision of the Council shall be final.

Should the Council of the Association decide that no essay submitted is of sufficient merit, no award will be made in the year 1950.

Preliminary notice of entry for this competition is required, and a form of application can be obtained from the Secretary of the Association.

Each essay must be typewritten or printed in the English language, must be distinguished by a motto, and must be accompanied by a sealed envelope marked with the same motto and enclosing the candidate's name and address.

The writer of the essay to whom the prize is awarded may, on the initiative of the Science Committee of the Association, be requested to prepare a paper on the subject for publication in the *British Medical Journal*, or for presentation to the appropriate section of the annual meeting of the Association.

Essays must be forwarded so as to reach the Secretary, British Medical Association House, Tavistock Square, London, W.C.1, not later than December 31, 1949. The prize will be awarded at the annual meeting of the Association to be held in 1950.

Inquiries relative to the prize should be addressed to the Secretary of the Association.

Medical Societies.

MELBOURNE PÆDIATRIC SOCIETY.

A MEETING of the Melbourne Pædiatric Society was held at the Children's Hospital, Carlton, Victoria, on May 11, 1949.

Juvenile Posture.

DR. ERIC PRICE read a paper entitled "Juvenile Posture of the Legs and Knees" (see page 589).

DR. JEAN MACNAMARA read a paper entitled "Fundamentals of Posture" (see page 592).

DR. ELIZABETH MCCOMAS read a paper entitled "Disabilities of the Foot in the Infant and Young Child". In opening her paper Dr. McComas stated that most of her attention would be directed to the minor disabilities of the feet occurring among infants and young children. She wished to emphasize two important facts: firstly, that those minor disabilities could be dealt with very satisfactorily when they were recognized and treated early, and secondly, that if early recognition and treatment were not effected then serious disabilities might occur. The group of cases under consideration had their origin chiefly in abnormal positions of the legs and feet *in utero* and a persistence of those positions after birth, in mild familial disorders of posture, and in abnormalities arising from postural defects in the early days of walking. The following defects were then discussed.

Metatarsus Varus.

Dr. McComas stated that in *metatarsus varus* there was an inswinging of the forefoot from the mid-tarsus, and in a well developed case it was easily demonstrable radiologically. The defect seemed to occur in a foot with an overlong hallux. It also appeared to be encouraged by the position of the foot *in utero*. In the majority of cases the deformity was mild and might be readily overcome by stretching of the inverted part of the foot by the mother. It was important to have regular medical supervision until the child was walking well as there might be a relapse when the child started to walk, probably due to intoeing for balance. In a few of the more severe cases strapping and application of a padded wooden spatula along the inner border of the foot was necessary, while in the most advanced cases manipulation and application of plaster with the patient under general anæsthesia might be necessary. That procedure might have to be postponed until the child was a few months old, owing to technical difficulties. Should the patient not be examined until late, and when he was walking, then treatment was by his wearing shoes on opposite feet and at night using a reverse Dennis Brown bar. Accurate diagnosis was essential, for if a *metatarsus varus* was mistaken for *talipes equinovarus* and the foot was strapped for *talipes equinovarus*, then a nasty valgus ankle might result. The important diagnostic feature was that in *metatarsus varus* the heel was straight.

Talipes Calcaneovalgus.

Talipes calcaneovalgus was found in the newborn and the foot was found to be folded back so that the dorsum of the foot was against the anterior surface of the tibia. In the majority of infants gentle massage and stretching of the foot to a normal position by the mother would usually effect a complete cure in a few weeks. In a few cases, in which the soft tissues in the front of the ankle had tightened, it might be necessary to apply an anterior splint either of plaster or of moulded aluminium or plastic. Occasionally a complete plaster might be necessary. Regular medical supervision was advisable until the child was walking.

Congenital Curled Toes.

In patients with congenital curled toes, usually the fourth or fifth toe was curled in and commonly the disorder was familial. In a few patients strapping might help, but usually it had little effect. Usually it was better to order no treatment other than making sure the patient chose suitable footwear. If symptoms occurred at a later date a plastic operation would be necessary. The most usual operations were either a fillet, or a "Z" plastic operation on the web together with transplanting of the *extensor digiti quinti* to the *abductor digiti quinti* in the case of the fifth toe. Occasional interphalangeal arthrodesis might be necessary, but was not really satisfactory in children.

Elevated Toes.

The condition of elevated toes usually affected the second toe and/or the third toe. Strapping and, in some cases, weaving with tape might assist the correction of the deformity.

Hammer Toes..

Hammer toes usually occurred in older children or adults, but were occasionally found in small children. They might be familial or result from the wearing of too short shoes or socks if the child had an overlong second or third toe. In the young child the condition could frequently be alleviated by the wearing of a night splint.

Pes Planus.

The true congenital type of *pes planus* was rare. Planus feet were usual in the infant, as the intrinsic muscles of the foot did not develop their full power until the age of about eighteen to twenty-four months. It would appear that the true longitudinal arch developed about the same time as the plantar reflex became flexor.

Pes Valgus.

The presence of *pes valgus* explained most of the cases in which young children were said to have "flat feet". Small children had pronounced laxity of the capsules and ligaments around joints and that might be accentuated by one or any combination of the following factors: (i) temporary muscle weakness, such as that which followed a long period of ill health, for example, in the chronically ailing child; (ii) being overweight; (iii) late walking; (iv) walking on a wide base with feet pointed out; (v) knock-knees; (vi) tight calf. Muscles might not give sufficient support to joints, so that the weight was transmitted wrongly; that led to stretching of the ligaments on the inner side of the subastragaloid joints, causing a "rolled over" foot which later became fixed in that position owing to shortening of the ligaments on the outer side of the foot. That foot was not a true "flat foot" until structural deformities occurred at a late stage, as the deformity would be apparent only when weight was borne on the feet. If the child was sat up and the sole of the foot was inspected, it would be seen that a good arch was present. Treatment would depend on the cause and on the age of the child. For the young child the use of a moulded leather or sponge-rubber valgus insole, together with a Thomas heel, was all that was necessary. Should the arch be well formed the Thomas heel alone might be all that was required. In the grosser type of case it might be necessary to use splints and then a short outside iron and inside "T" strap during the day and a reverse Masson night splint whilst the patient was in bed. For the child old enough to cooperate, exercises supervised by a physiotherapist were very beneficial. If there was a primary condition, such as knock-knees or tight calf, that disorder must be treated also.

Pes Cavus.

While more often seen in older children, *pes cavus* might occasionally be seen in quite young children. In infants it was very rare except in association with neurological lesions. The following were the common types: (i) Those of unknown ætiology. There might be a familial tendency, and the condition tended to occur in young children who were very large for their ages. The tightening of the plantar fascia was out of all proportion to any tightening of the *tendo Achillis*, and had a pronounced bow-string effect. (ii) Those due to faulty footwear, especially short shoes and short socks. (iii) Those secondary to weak intrinsic muscles of the foot. That was found particularly as a late complication of poliomyelitis and particularly in the less affected foot. Treatment naturally depended on the degree of the deformity. For the younger child, stretching was of more use than for the older child, and for many patients physiotherapy, together with a cavus night shoe, would be sufficient. In very pronounced cases manipulation and application of plaster with the patient under general anæsthesia might be necessary. Occasionally more extreme orthopædic surgery might be necessary.

In conclusion, Dr. McComas stressed the importance of early and correct diagnosis. Treatment was then usually a relatively simple and an entirely satisfactory procedure.

DR. J. G. WHITAKER asked Dr. McComas what treatment she advised in the severe resistant type of *metatarsus varus*.

Dr. McComas replied that she had had no actual experience in that group as all her patients had been diagnosed in the early stages and had responded well to treatment.

DR. TYRER stated that he had been surprised at the frequency of postural defects in children, especially those country children attending the Lord Mayor's Camp in Portsea. He was also gratified to see the rapid improvement with physiotherapy and a healthy open-air life with good food. He considered that adequate teaching of family doctors and of parents was essential to prevent these common disabilities.

DR. ROBERT SOUTHBY, DR. KATE CAMPBELL and DR. JOHN COLEBATCH stressed the importance of general nutrition and general health and care in preventing postural defects. Poor home conditions and flat life, where the children could not obtain adequate play facilities, were very detrimental to the life of the child community. Those things should receive adequate attention and be brought before society.

DR. JOHN BEGG asked Dr. Price why plaster of Paris casts frequently straightened the bow legs of children.

Dr. Price considered that the plaster abolished any extrinsic factors causing the bowing of the legs, for example, weight-bearing and faulty postures, and that allowed the legs to grow straight.

DR. VERNON COLLINS and DR. J. B. COLQUHOUN stated that they did not agree with Dr. Macnamara in her opinion that abnormal or unusual attitudes that children adopted in sitting or lying down were important causes of skeletal deformity.

Dr. Macnamara, in reply, stated that while that view might be true for some children it was certainly not true for all children.

Correspondence.

SOME PROBLEMS ASSOCIATED WITH THE MANAGEMENT OF CARCINOMA OF THE BREAST.

SIR: With the results of modern efficient and sufficient radiotherapy to hand, there is increasing recognition that cancer of the breast is a radio-surgical problem, the role of the surgeon becoming complementary rather than the mainstay of treatment as necessitated in the past.

Mr. C. A. C. Leggett (this journal, September 10, 1949) is to be congratulated on his clear and logical discussion of problems associated with this disease. His approach is that of the surgeon, but his facts bear out the point I have made. Only in the small group of cases where there is no microscopical gland involvement could the complementary radiotherapy be reasonably dispensed with, and then only if the operator is in the same class as Sir Gordon Taylor. Unfortunately not many are, and some, judging by their approach, do not realize it. The collected figures of surgeons in Gordon Taylor's own hospital, 64%, compare badly with Gordon Taylor's own figure, 86%. The consolidated figures for England are worse.

In Edinburgh, in collaboration with the surgical staff, with first-class radiotherapy, Professor McWhirter demonstrated that the average hospital figures for both stage I

and stage II were improved by about 20% by post-operative therapy. It is obvious that there are few cases operated on in Australia which should not be benefited by radiotherapy. We can look for improvement in this field, if a radiotherapist can collaborate in the planning of the management and treatment of every case.

It must be emphasized that reliance on radiotherapy is perilous unless the dose used is cancericidal and its technical application is scientific and accurate. Radiotherapists must also be careful not to automatically attribute to their own work the results obtained by the best workers in their speciality.

The recognition of these facts will make the desirable collaboration more critical and more effective.

In spite of the most ideal treatment of the primary and regional zones, it is obvious in many cases that distant spread had unfortunately occurred before the patient saw the clinician. In these cases our role, though often very effective, is only palliative.

It appears that further improvement in countering the effects of this rather important disease will be obtained by a persistent campaign to bring under observation all breast tumours at the earliest possible stage.

Yours, etc.,

Perth, October 3, 1949. ALAN J. M. NELSON.

A CASE OF RARE FALLOPIAN TUBAL ABNORMALITY.

SIR: I have had occasion recently to operate upon a young Polish woman, who has been suffering from lower abdominal pain of old standing. The signs and symptoms suggested a chronic pelvic disorder.

On opening the pelvis, both ovaries showed follicular hæmorrhagic cysts of moderate size, which were shelled out. The left Fallopian tube was normal. From the free surface of the right Fallopian tube, however, projected a small tube-like structure about one-third of a centimetre in length, with immature fimbriæ, situated about one-third of an inch away from the fimbrial end of the tube, at an angle of 30° pointing towards the corresponding ovary. A probe was passed easily through the mouth of the structure into the patent tube. Apparently it was an accessory abdominal ostium.

The remarkable fact about the case is that the woman has been sterile since she married five or six years ago, and it would be interesting to note her future progress in this regard.

I considered this case of interest to gynæcologists, as from inquiries conducted no one seems to have seen an anomaly of this type.

I should be grateful to hear of anyone having record of such an anomaly or a similar one.

Yours, etc.,

761 Darling Street, Rozelle, New South Wales. October 7, 1949. OSCAR RYCHTER.

SYPHILIS RESURGENS.

SIR: Dr. E. H. Molesworth's article "Syphilis Resurgens" (THE MEDICAL JOURNAL OF AUSTRALIA, October 1, 1949) is welcome, though I do not agree with some of his opinions. I share his concern regarding the possibility of repercussions from the unguarded use of penicillin in the treatment of syphilis. Penicillin has not yet passed the test of time, as a cure, although if one may judge from the many reports, it has probably been successful in a large number of primary syphilitic infections.

In the divisional clinic in the Health Department we have a small number of patients under treatment with penicillin, and these are being carefully watched and submitted to quantitative Wassermann tests at monthly intervals. Our "follow up" is strictly carried out and any default checked with a minimum of delay. In a public clinic we can do this, but will a practitioner in private practice carry out the same rigid routine? If he will not, then he should not use penicillin in the treatment of syphilis.

Dr. Molesworth mentions the compulsory notification of patients by number and not by name and says that this in the past was very helpful in ensuring regular attendance. I do not see how such method of notification can affect attendance. It is the notification of name and address on default that is of value, provided that the name and address are not false. Few private medical practitioners notify the names and addresses of patients who cease attendance before having satisfied the tests for cure.

The increase in early syphilis (primary and secondary) was first noticed in 1938, and today the incidence is still higher than prior to that year back to the coming into force of the *Venereal Diseases Act*, 1918, in December, 1920. Over the past five years the incidence per 100,000 of population *per annum* for early syphilis has been as follows in New South Wales: 1944, 7·1; 1945, 9·0; 1946, 18·1; 1947, 17·3; 1948, 20·4. The incidence for the year 1948 was higher than that of Canada (19·8), which had, over the other years, shown an incidence higher than ours. This year there has, so far, been a decline in our figures, and the incidence will probably be somewhat similar to that for the year 1947. I do not think that the increase in early syphilis has been due to any departure from the use of intravenous arsphenamines, but is due probably to the continued existence of unlocated and uncontrolled sources of syphilis.

In regard to "Acetylarsan", which we are still using with a bismuth preparation for the majority of our syphilitic patients, I feel sure that its use has been satisfactory. We have used this preparation for just on sixteen years with a close liaison with the serologists and a very efficient "follow up" of patients. We have had a long and wide experience in its use in our clinic and are satisfied with the results.

I may add that there has been a decline in tabes and paresis in the community, which would not be expected if the drugs used were not efficient. The old disasters of late syphilis are not seen as they used to be, but if penicillin is carelessly used and patients unguarded by adequate "follow up" and necessary tests for cure, the old conditions may be seen once again. Also, new infection may be spread as it is said that there is a higher percentage of infectious relapse after penicillin treatment than after the older arsenical methods.

Dr. Molesworth has done us a service in sounding a note of warning in regard to the use of new methods of treatment.

Yours, etc.,

Sydney, October 10, 1949. J. COOPER BOOTH.

STUDIES ON THE EPIDEMIOLOGY OF THE 1947–1948 EPIDEMIC OF POLIOMYELITIS IN SOUTH AUSTRALIA.

SIR: The problem of the mode of transmission of poliomyelitis is very much with us from time to time, perhaps more so in the southern States. Apart from the radio and the daily Press, an article in your pages on October 1 has brought it before our notice again.

The answer to the problem lies somewhere within our present conception of the spread of communicable diseases; and I am convinced that the answer lies in a "carrier" enteric state; the closest analogy being that which occurs in the gall-bladder with typhoid fever "carriers". But virus diseases are notably far more infectious than bacterial ones. The hands therefore come to adopt a far more important role in poliomyelitis than in typhoid fever. Not only does contamination occur in the preparation and handling of food and milk, but also by close personal contact, such as hand-shaking, handling communal articles and passing on coins and other moneys. A case has come to my notice in a very roundabout way, where a woman went for her first antenatal examination and subsequently developed poliomyelitis, the doctor's daughter having the disease at about the time of examination. I am not aware whether a pelvic examination was done, and if so, whether gloves were used or not.

In their recent article, Southcott, Crosby and Stenhouse attempted to show that contact was more important than enteric transmission in the 1947-1948 epidemic in South Australia. The criteria which they adopted can all be satisfactorily explained away by the "carrier" enteric state. Diarrhœa occurred in only 6·4% of their cases, whilst sore throat occurred in 41·7%; this does not mean anything, as diarrhœa occurs only in 20% to 30% of cases of typhoid fever (Osler) where gross inflammatory changes occur in the intestines; and acute bronchitis is one of the commonest initial symptoms of typhoid fever.

It is interesting to note that a paralytic condition occurs in sheep called enterotoxæmia. This is caused by a bacterium

known as *Clostridium ovitoxicosus*, which produces a powerful toxin in the alimentary canal. A similar condition occurs in horses, and has been considered as probably due to a virus.

The reason for my taking up the cudgels is not to decry any painstaking investigations, but rather to prevent inferences from possibly leading astray future lines of investigation.

Yours, etc.,

ROBERT S. WILKINSON.

Pinnaroo,
South Australia,
October 5, 1949.

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 71, of September 29, 1949.

NAVAL FORCES OF THE COMMONWEALTH.

Permanent Naval Forces of the Commonwealth (Sea-Going Forces).

Transfer to Emergency List.—Surgeon Lieutenant-Commander (D) Alan Victor Ward is transferred to the Emergency List, dated 6th May, 1949.

Citizen Naval Forces of the Commonwealth.

Royal Australian Naval Volunteer Reserve.

Promotions.—Surgeon Lieutenants Percy Maxwell Brett, Archibald William James Watts, Peter Donald Graeme Fox and Austen Stewart Ferguson are promoted to the rank of Surgeon Lieutenant-Commander, dated 2nd August, 1949.

The undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 72, of October 6, 1949.

ROYAL AUSTRALIAN AIR FORCE.

Permanent Air Force: Medical Branch.

David Hugh Prentice, M.B., B.S. (297507) is appointed to a short service commission on probation for a period of twelve months, 19th July, 1949, with the rank of Flight Lieutenant.

Flight Lieutenant (Temporary Squadron Leader) John William Lee Atkinson (251414) is appointed from the Reserve to a short service commission, on probation for a period of twelve months, 9th June, 1949, with the rank of Flight Lieutenant, relinquishing the temporary rank of Squadron Leader, 9th June, 1949.

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

Overseas Lecturer.

THE Post-Graduate Committee in Medicine, in conjunction with the Australian Post-Graduate Federation in Medicine, has arranged for Professor F. A. E. Crew, F.R.S., D.Sc., Ph.D., M.D., F.R.C.P. (Ed.), Professor of Public Health and Social Medicine in the University of Edinburgh, to give a series of lectures as follows: Wednesday, November 2, 1949: "The Nature and Significance of Sex." Friday, November 4, 1949: "Biology of Death." Tuesday, November 8, 1949: "Medico-Sociological Aspects of an Aging Population." Thursday, November 10, 1949: "The Contributions of Genetics to Medicine." All lectures will be held in the Stawell Memorial Hall, 145 Macquarie Street, Sydney, at 8.15 p.m.

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED OCTOBER 1, 1949.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.[3]	Australian Capital Territory.	Australia.[3]
Ankylostomiasis	*	1(1)	1	..	*	..	..	..	2
Anthrax	*	..	..	..	..	..	..	..	..
Beriberi	*	*	*	*	*	*	..	*	..
Bilharziasis	*	..	..	..	..	..	..	..	..
Cerebro-spinal Meningitis	..	1(1)	2(1)	..	..	..	..	..	3
Cholera	..	..	..	..	..	..	..	..	..
Coastal Fever(*a*)	*	*	..	*	*	*	*	*	..
Dengue	*	*	*	*	*	*	..	*	..
Diarrhœa (Infantile)	..	..	4(4)	..	..	..	..	..	4
Diphtheria	14(7)	5(5)	3(1)	..	1	1	..	..	24
Dysentery(*b*)	*	..	..	..	..	..	..	..	..
Encephalitis Lethargica	..	..	..	..	..	..	..	..	..
Erysipelas	*	*	*	1	*	*	..	..	1
Filariasis	*	..	..	..	..	..	..	..	..
Helminthiasis	*	..	*	*	*	*	*	*	..
Hydatid	*	1	*	*	..	*	*	..	1
Influenza	*	*	*	1(1)	*	*	..	*	1
Leprosy	..	..	..	..	..	..	..	..	..
Malaria(*c*)	*	(*c*)	(*c*)	(*c*)	(*c*)	(*c*)	(*c*)	(*c*)	(*c*)
Measles	*	*	*	53(25)	*	*	..	1	53
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	2	17(10)	..	22(17)	..	5(1)	..	..	46
Psittacosis	*	..	*	..	*	*	*	*	..
Puerperal Fever	1	..	..	..	..	..	..	..	1
Rubella	*	*	7(6)	*	1	*	..	1	9
Scarlet Fever	32(16)	12(8)	5(1)	6(3)	6(6)	2(1)	..	..	63
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	*	1	..	*	*	*	*	*	1
Trachoma	*	..	..	*	*	*	*	*	..
Tuberculosis(*d*)	25(15)	16(9)	6	5(5)	3(1)	3(2)	..	..	58
Typhoid Fever(*e*)	..	..	..	..	2(2)	..	..	..	2
Typhus (Endemic)(*f*)	..	..	3(1)	..	2(2)	..	..	..	5
Undulant Fever	..	..	..	..	..	..	..	..	..
Weil's Disease(*g*)	*	*	..	*	*	*	*	*	..
Whooping Cough	*	*	*	33(7)	*	*	..	..	33
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] The form of this table is taken from the *Official Year Book of the Commonwealth of Australia*, Number 36, 1944–1945. Figures in parentheses are those for the metropolitan area.
[2] Figures not available.
[3] Figures incomplete owing to absence of returns from Northern Territory.
* Not notifiable.
(*a*) Includes "Mossman" and "Sarina" fevers. (*b*) Includes amœbic and bacillary. (*c*) Statistics inexact with varying practice with regard to relapses in Service cases infected overseas. (*d*) Includes all forms except in Northern Territory, where only pulmonary tuberculosis is notifiable. (*e*) Includes enteric fever, paratyphoid fevers and other Salmonella infections. (*f*) Cases reported include scrub, murine and tick typhus. (*g*) Includes leptospiroses, Weil's and para-Weil's disease.

The fee for the course of lectures is 10s. 6d., and admission will be by ticket only. These may be obtained on application to the Secretary of the Committee. It is possible that a public lecture on "Biological Aspects of Marriage" will be arranged for the evening of November 9, 1949, details of which will be announced later.

It is possible that some alteration in these arrangements may be necessary. If so, they will be published in *The Sydney Morning Herald* under the heading "Lectures".

Obituary.

HIBBERT ALAN STEPHEN NEWTON.

THE following appreciation has been received from Dr. F. H. Moran.

It was my privilege, during the recent war, to serve on the Medical Equipment Control Committee under the chairmanship of Sir Alan Newton.

Only those closely associated with the work of this committee can appreciate how arduous were his duties and how grave his responsibilities, and there is little doubt that the strain of those war years took their toll of his strength and energies.

Even when recurrent attacks of asthma prevented his attending the office he insisted on having bedside conferences with his executive officers in order to deal personally with any current problems of major significance. He drove himself hard—too hard—and paid the inevitable penalty.

His administrative ability, which had been evidenced in other of his public activities, was seen to full advantage in the responsible task of ensuring adequate medical and surgical supplies both for the fighting services and the civilian population of Australia during those critical years. The ramifications of this work were endless and the problems unceasing, yet, at no time did it appear that the field was too vast or the problem insurmountable. Things were always "under control", there was never any panic under his able leadership. Unsparing of himself, he inspired a like zeal in those with whom he worked. His criticisms were always just and his appreciation of services well rendered, readily expressed. One always felt that, if need arose, wise counsel, based upon carefully considered opinion, was available for the asking.

All these factors combined to engender in his associates a profound spirit of loyalty, and to "let the chairman down" was simply unthinkable. Surely, to evoke loyal service from his followers is the mark of the true leader.

As a man, his integrity was absolute. In the course of his duties as chairman of this particular committee he perforce dealt with a wide variety of men both from the world of commerce and from government departments, and there were presented to him innumerable facets of human nature. All, without exception, saw the honesty of purpose which lay behind everything that he said or did; there was never a suggestion of self-seeking motives. His sole aim was the furtherance of the war effort and the national interest, and this forthright attitude elicited a spirit of cooperation which invariably produced results.

He was perhaps seen at his best when dealing with some lengthy official screed which spread itself over several pages. Hating circumlocution, he would rapidly crystallize the whole matter into a couple of succinct paragraphs, and what had at first sight appeared an awe-inspiring document resolved itself into a simple question requiring a simple answer. It was this clarity of thought, betokening the well-ordered mind, which enabled him to accomplish such a large amount of work in a relatively short time.

In addition to those attributes which made him so outstanding as an organizer, an administrator and a leader, there was a depth of kindliness in his nature which was perhaps unsuspected by many. I personally had ample evidence of this and I cherish the memory of many of his kindly gestures and thoughtful acts. In addition to a profound admiration, I had a very real affection for him, and with his passing I feel that I have lost a valued friend.

HILDA WIENHOLT.

WE regret to announce the death of Dr. Hilda Wienholt, which occurred on September 20, 1949, at Brisbane.

Nominations and Elections.

THE undermentioned has applied for election as a member of the South Australian Branch of the British Medical Association:

Archer, Geraldine, M.B., B.S., 1948 (Univ. Adelaide), Landfall, East Tamar, Tasmania.

Diary for the Month.

OCT. 25.—New South Wales Branch, B.M.A.: Ethics Committee.
OCT. 26.—Victorian Branch, B.M.A.: Council Meeting.
OCT. 27.—South Australian Branch, B.M.A.: Branch Meeting.
OCT. 27.—New South Wales Branch, B.M.A.: Branch Meeting.
OCT. 28.—Queensland Branch, B.M.A.: Council Meeting.
NOV. 1.—New South Wales Branch, B.M.A.: Organization and Science Committee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135 Macquarie Street, Sydney): Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester United Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178 North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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